

Plastic Products



"Famous Premiums in Plastics"

February, 1934

Volume X

Number 2

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Condensation Blacks

for

THERMO PLASTICS

THERMO CURING PLASTICS

MOLDING POWDERS

LAMINATING VARNISHES

CASTING RESINS

The Calco Chemical Company

INCORPORATED

A Unit of American Cyanamid Company

BOUND BROOK, N. J.

Boston Philadelphia New York Charlotte Chicago

Customer . . . "Your picture frames are simply exquisite. Tell me—are they very expensive? . . . I'd just love to select several right now."

Salesman . . . "That makes it fortunate for both of us, Mrs. Galvin, because these new frames are not expensive. They're created from Catalin—The Gem of Modern Industry."

CATALIN

Ever so many practical applications are possible with this most beautiful of plastics.

Through the use of CATALIN, we now find that picture frames have been able to catch and express the moving spirit of modernism. In this, and in numerous other fields of industry, the adoption of CATALIN has brought about improved manufacturing methods and greatly increased sales results.

CATALIN machines similarly to brass, without requiring special tools and equipment. It is non-inflammable—highly acid-resistant—odorless and tasteless. Because of its unique merchandising value, CATALIN deserves your investigation.

"THE GEM OF MODERN INDUSTRY"



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Plastic Products

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and the Engineering Index Service*

Volume X

Number 2



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Plastic Products

VOLUME X



NUMBER 2

The NRA Whirligig

WE are learning that a code is not what we thought it was. Essentially every code is an agreement in restraint of trade for the common benefit of an industry. The promise was that an industry may get together under the supervision of the Government to suppress unfair practices and unscrupulous competition in ways forbidden by the Anti-Trust Laws. This has been twisted into a mandatory demand that industries must organize, that they must recognize the labor unions, and now that they cannot effectively relieve the competitive pressure.

From the point of view of recovery, this is all bad, but it is made worse by the constantly changing emphasis put upon NRA objectives. First, it was re-employment; then, wages; then, collective bargaining; more recently, control; and now, the conditions of competition. Each in turn has been the chief concern of Gen. Johnson. These erratic flights of the blue eagle are very confusing, and they result in inequalities

among different codes drawn up with different objectives in view.

From the point of view of the business man, it is pathetic to see how little has been accomplished in this succession of aims. Re-employment—statistics are notoriously unsatisfactory, but both England and Germany show greater percentage gains during the past six months. Wages—according to the National Industrial Conference Board, average weekly earnings have declined from \$19.15 in July to \$18.58 in December. Collective bargaining—128 per cent. increase of industries and trades which have unionized, and, at the same time, strikes estimated to be “more than 6,000”. Control—do you know of a single code that is being fairly and efficiently enforced?

A century hence, some historian will write a famous monograph on the NRA. Today its uncertainties and injustices press too closely upon our daily business lives for a fair appraisal of its ultimate effect, but so far as recovery is concerned, it seems to have harmed more than it helped.

PREMIUMS

From the Plastics Point-of-View

By Nathaniel Williamson

WHAT you, or I or anyone else thinks about premiums—and a great many people have of late been giving this subject a good deal of solid thought—depends very largely upon the point-of-view of the thinker. The public who receives premiums and the manufacturer who distributes them; the maker of premiums in many fields and the controller of the selling codes down in Washington, all these regard premiums quite differently.

Even within a single group the point-of-view is not always the same. The molder who is "sitting pretty" on premiums, with some nice business at fair prices, naturally looks at premiums differently from the molder who has never gone in for this line of trade. In Washington there are certainly two very sharply distinguished points-of-view on this subject.

The ultimate consumer, who is apt to look upon a premium as "something for nothing," certainly has shown plainly by his ready response to the premium appeal that he likes this idea, and quite naturally his opinion colors considerably the premium-using manufacturer's considerations. With this ancient truism, let us pass on to the points-of-view closer to the interest of the plastics industry, points-of-views which we will find are more complicated and which are today shifting.

It is not alone in this matter of premiums that two schools of thought are displayed in Washington. The same differences are as plain as day and night throughout many branches of the Roosevelt Administration and in their different ways they influence legislation, administrative regulations, plans, and budgets. They spring from a marked difference in objective. The one group regards the emergency created by the depression as a business crisis to be cured as quickly as possible: the other, as an

opportunity to revolutionize our economic and social foundations.

The first group regards premiums realistically. They recognize them first as stimulators of trade, and second, as representing in themselves a very substantial business. As a business stimulator they look upon them favorably. As a consumer of materials and employer of labor they are anxious to see the premium business prosper. They recognize the part that premiums play in moving all sorts of goods from foodstuffs to silverware. They know that two big potteries in Ohio, a clock factory in New England, a textile mill in North Carolina, a paint factory in Illinois—just to pick out a few plants in different industries which are today operated wholly upon premium business—are not going to be shut down without involving further capital losses and creating new unemployment. This recovery-minded group is friendly to premiums.

The revolutionary-minded group is not. They look upon them as inherently a deception practiced upon the buyer. The premium, in their eyes, is a sort of concealed price cut, a very unfair means of competition. They are fired with the idea of refining all our business practices to pristine purity. To their way of thinking the premium is something that must go.

This confusion of purposes in the New Deal advocates, and the resulting divergent point-of-view, has quite naturally created a good deal of confusion in the minds of many regarding just what is the true status of premiums.

This confusion has been worse confounded by the unfortunate fact that the word "premium" is used in a great number of codes to express the idea of commercial bribery. The distinction has not always been clearly made between gifts to the ultimate buyer and gifts to the employees or agents of a business house

Mothers! Here's How Ovaltine

Curbs Child's Nervousness

While Adding Weight A Pound A Week Or More

Ovaltine is a scientific food concentrate, approved by more than 20,000 doctors and child specialists largely because of its remarkable power to increase both weight and nerve power.

So remarkable are the results afforded to Ovaltine that, during the World War, medical authorities made it a standard ration for rebuilding childbearing, over-exhausted soldiers. With recent scientific tests conducted among school children in New York State, have demonstrated that nervousness was actually decreased as much as 30% in 2 weeks when Ovaltine was given.

80% of all nervous, under-poor children in these New York State hospitals showed an increase in nerve power, nervousness—as measured by the Glass-University of Minnesota checking system—was reduced as much as 10% in a single week.

While these results are of outstanding significance to mothers of nervous children, they are equally important to the mothers of underweight children, too. For child specialists have long observed that underweight and nervousness go hand in hand.

Then when a child is given Ovaltine he benefits 2 ways. For it breaks up the "nervous circle" that nervousness and underweight always tend to create. And usually with weight on the rise of a pound a week or more.

Thousands of nervous people, men and women, take Ovaltine to restore vitality when fatigued. Physicians also recommend it for sleeplessness—and as a strengthening food-drink for nursing mothers, convalescents, and the aged.

You simply mix Ovaltine with milk—either as an adult—and children love it for its delicious taste. (Place the special four offer of the genuine Little Orphan Annie Mug for serving hot Ovaltine. It adds that "party touch" at mealtimes that every child delights in.)

FREE

TO Boys and Girls!

MAIL FOR LITTLE ORPHAN ANNIE MUG FREE!

There's a chance to get a very special Little Orphan Annie Mug absolutely FREE! It's a winner, isn't it? It holds just as much as one of your mother's regular tea cups—only it has a beautiful, colorful picture of Little Orphan Annie and her dog, Sandy, right on it. Just the thing for drinking your Ovaltine out of—worth at least \$10 if you should buy one, but you get it absolutely free.

Now's time to get it. First, cut out and fill in the coupon below. Then ask your mother to get you a can of Ovaltine. After you get it, take out all of the thin cardboard and you find under the lid of the can and mail it, together with the coupon below, to THE WANDER COMPANY, Dept. 10-N, 180 N. Michigan Avenue, CHICAGO, ILL. In a few days, the postman will bring you a Little Orphan Annie Mug free to keep for your very own! You'll be happy about it, the mother you love!

Be sure the coupon gets here. And ask your mother to get you a can of Ovaltine today at any drug or grocery store.

FREE! Mail This For A LITTLE ORPHAN ANNIE MUG FREE!

Yon, Wander Company, Dept. 10-N
180 N. Michigan Ave., Chicago, Ill.

I am enclosing all of the thin cardboard and keep under the lid of a can of Ovaltine. Please send me a Little Orphan Annie Mug FREE!
(Not good after July 1, 1933)

Name _____
(Please print plainly IN PENCIL)

Address _____

City _____ State _____

(Only one mug to a person)

OVALTINE

The Swiss Food-Drink

Most youngsters have been thrilled by the antics of Little Orphan Annie in the Sunday funnies, therefore what more logical place for the makers of Ovaltine to advertise their food-drink and offer their premium mugs? Above, typical advertisement taken from a Sunday edition.

FREE!

Please Note: THIS OFFER EXPIRES
MIDNIGHT, NOV. 1, 1933—CLIP COUPON NOW!

which is buying goods either for its own manufacturing purposes or for re-sale to the ultimate consumer. This difference exists. It is well recognized in Washington. In fact, the President himself has endeavored to clear up the misunderstanding arising out of the use of this word in two different meanings, and issued on November twenty-ninth, an executive order which reads:

In order to effectuate the policy of title I of the National Industrial Recovery Act, approved June 16, 1933, I, Franklin D. Roosevelt, President of the United States, pursuant to the authority vested in me by title I of said National Industrial Recovery Act, hereby prescribe the following rules and regulations which shall have the effect of modifying any inconsistent provisions of any order, approval, rule or regulation heretofore issued under title I of said Act.

1. By reason of confusion and misapprehension which has arisen regarding the meaning of certain commercial bribery provisions included in codes heretofore approved by me, I hereby interpret all such provisions to mean the following:

No member of the industry shall give, permit to be given, or directly offer to give, anything of value for the purpose of influencing or rewarding the action of any employee, agent or representative of another in relation to the business of the employer of such employee, the principal of such agent or the represented party, without the knowledge of such employer, principal or party. Commercial bribery provisions shall not be construed to prohibit free and general distribution of articles commonly used for advertising except so far as such articles are actually used for commercial bribery as hereinabove defined.

2. I further order that if commercial bribery provisions are hereafter included in codes they shall conform to the foregoing.

3. This order is intended to relate only to commercial bribery provisions and is not intended to interfere with an industry, if it so desires, dealing specifically with the subject of premiums in any way it may or shall have proposed if approved by me.

(Signed) Franklin D. Roosevelt.

Approval recommended:

Hugh S. Johnson, Administrator.

This is as plain as a pikestaff. Nevertheless another form of confusion was created by the wording of the Retail Code, Section II, Paragraph C:

Where a bona fide premium or certificate representing a share in a premium is given away with any article the base upon which the minimum price of the article is calculated shall include the cost of the premium or share thereof.

Accordingly, NRA Retail Bulletin Number One was forced to do a little more defining, as follows:

Paragraph C allows premiums to be given away with merchandise. But it provides that the cost of the premium to the retailer must be included in the price at which the retailer sells the article with which the premium is given away.

This Code provision, and the ruling covering it, are aimed not at the premium which is used by the manufacturer in a legitimate advertising or sales introduction campaign; but at retailers who



NOTE: GAY NEW DRESS FOR SOFTASILK. (Box kept from both new and old packages good on this offer.)



SEND THIS FOR FREE SET
of Betty Crocker's
4 NESTING MEASURING CUPS

BETTY CROCKER, Minneapolis, Minn.
Dear Betty Crocker: Enclosed please find the TOPS from TWO (2) packages of Softasilk for which please send the set of genuine Betty Crocker's Nesting Measuring Cups as a gift for trying Softasilk.
(Offer limited to U. S. A. only)

Name _____
Street or R. F. D. No. _____
City _____ State _____
(If you prefer not to send box tops, you may send \$1.00 for set of Nesting Measuring Cups.)

Ever since the first announcement of these measuring cup sets, there has been a scramble on the part of housewives to obtain these attractive, gayly-colored premiums. Offers, such as the one above, eclipsed by a time limit, have very often cleaned the grocer out of his entire stock of this cake flour in but a short time. One cannot blame a housewife for wanting them, for they are a sight more attractive utensils with which to bake than the ordinary glass measuring cups, so long a familiar sight in our kitchens.

make a practice of throwing in a hat with a suit of clothes, a pound of tea with a dollar's worth of groceries, a bridge lamp with a suite of furniture. They do not affect at all the distribution in either way, that is, either through the mails or through the retail dealers, of a free premium offered by the manufacturer along with purchases of his goods at the full and regular prices.

Unless the reform group gain complete dominance over the Washington situation, there is nothing to disturb the premium business as it affects plastics fabricators. At the moment, it is admitted that the revolutionists appear to be in ascendancy, but the NRA particularly has been veering back more and more towards the objective of helping business to recover along the more tried and true lines of economic activity. Moreover, it is the opinion of the shrewdest observers in the Capital that political opposition from the Republicans will stiffen as time goes on; that the tax-cost of the New Deal is to be subjected to increasing criticism; that with the natural revival of business activity there will be a growing distinct reaction to bureaucratic and socialistic activities on the part of the Government. Each of these influences, either acting independently or in concert, will tend to curb the reformers. Therefore, premiums would certainly appear to be safe from any too-drastic control in the NRA program, and the molder who is supplying this trade, or contemplating entering this field, may do so with as good assurances as are possible in these times that the business is not to be upset.

Industry's Feeling Toward Premiums

In the plastics industry premiums are viewed with mixed emotions. In the main the premium items have been big-quantity, low-price pieces. In several instances they have been the focal point of some pretty keenly competitive bidding. As such there are certain molders who hold that they have been a disturbing factor, just at a time when the business needs stabilization and sounder prices a good deal more than it does volume. In opposition to this point of view is the opinion that premiums have not only created direct, new business of considerable size, but that they have also kept busy, by replacement, many presses of molders who have made no bid whatsoever for this class of trade.

Estimates as to the volume of the premium business vary widely. It is pretty generally admitted, however, that while the General Foods' spoon has the record in number of pieces, it is the "Skippy" bowl that gets first place for the plastic material consumed by weight. A stunning total of over six million spoons have been given away and about five million of the famous bowl. Ovaltine have distributed over a million and a half of their "Orphan Annie" shakers, and General Mills, about a quarter million of their set of four measuring cups.

These well-known items, plus the various tumblers which have been used by Johnson & Johnson, Pepsodent, Milcomalt, and a number of others, pushed the 1933 consumption of urea plastics up about 2,000,000 pounds. In this field they have led the phenolic and pyroxylin plastics in tonnage; but the phenolics are not so far behind in weight consumption as the big total pieces of ureas would indicate. This is due, of course, to the fact that the cigarette and other re-use boxes, the compacts and jars, clocks and trays, have been in the main much larger and heavier objects. It is estimated that about a million and a quarter pounds of phenolics and possibly a third of this in pyroxylin have been consumed this past year in the premium business.

Judging from the plans of the big premium users and the orders in hand now by a score of the molders who have been leading in this field, there will probably be at least fifteen million plastic premium sets molded during this coming year, a figure that might be almost doubled by even three or four big new numbers. To date about twenty-five million sets have been molded, and as many of these consist of two or three parts the volume of the business has obviously been very great. In pounds of molding powders this will presumably mean 3,000,000 plus in 1934.

At the moment the foodstuffs field is the big plastic premium consumer, and there are here still great undeveloped possibilities. For example is it not a deep trade secret that a big cracker baker and a big canner are both considering plastic premiums? The toilet goods field is growing, and the Kool cigarette introductory campaign, if it continues as successfully as it has begun, may bring some big orders from other tobacco firms. The entire re-use container field is as yet all but unscratched and is almost as broad as the land is wide. The use of premium plates, etc. in the moving picture theatres has been a sizable piece of trade; but it has not always proved to be highly satisfactory, due to the many changes among the theatre owners. A strong, nationwide organization to sell and finance this end of the premium business is, in the opinion of one molder who has had a lot of experience with the movies, sorely needed, would render a real service, and ought to be very profitable.

The Premium Shall Not Pass

Whatever we may think of the premium business, it is here to stay in the plastics industry. Plastics have altogether too many points making them specially adaptable for premium work to make us think that they will not find increasing use as premiums.

The very peculiarities of this class of trade which are most bitterly criticized; namely, the big-quantity, low-price character of these premium orders, would seem to have distinct compensations from the point of view of the plastics industry as a whole. The molder who undertakes premium business ties up a lot of press capacity, and there have been several instances of switching jobs. This means, of course, a "spreading of the available work" throughout the industry. Critics of the character of the premium business seldom fail to take this very favorable factor in account, a factor which may be actually helping their own business.

"Plastic Molding"

Reviewed by C. W. Blount, Bakelite Corporation

"Plastic Molding" by Louis F. Rahm provides for the engineer and production manager in one volume a bird's eye view of commercial plastic materials and their fabrication. The frank and fair manner in which the author deals with the advantages and disadvantages of the various types of plastics should aid the engineer in making wise choice of a material for his particular needs.

Molds for fabricating plastics are classified, illustrated and explained in a manner making a difficult subject both interesting and easily understood. The discussion of Design Details should give the reader a thorough understanding of the essential features of mold assembly and disassembly and acquaint him with the most economical means of accomplishing the three most important steps in plastics molding, namely, getting the material into the mold, applying the heat and pressure, and removing the molded product.

Presses and accessory equipment of all sorts are well explained. Enough is given to allow one to choose wisely a press for one's particular needs. Also, discussion is made of plant layout, installation, and maintenance problems.

The appendix lists and classifies an astounding number of trade names applied to plastics. Tables are included which should be very useful to the engineer in specifying molding plant equipment. An index facilitates the use of the book for reference.

There are perhaps certain details of technique with which the experienced molder might not agree, but even the most experienced will find much that is helpful. It is in its comprehensiveness and up-to-dateness that the book is likely to be of greatest value to the experienced and inexperienced alike. In fact, "Plastic Molding" is a book that should be read by everybody purchasing, using or producing molded plastics.

Measuring Plasticity of Hot Molding Compounds

Description of the "Flow Tester"

By Gilbert L. Peakes
Bakelite Corporation

THE general type of compound with which we are here concerned is a combination of suitable filler with a resin which under the action of heat, first melts (physically) and then hardens (chemically). Such mixtures are in general known as hot-molding compounds.

Plasticity measurement, as conducted at present in such varied products as tooth pastes, paint, asphalt, clay, grease, etc., addresses itself to properties which in general do not vary during the measurement. Even with the many good minds at work on plasticity measurement, the difficulties of evaluating plastic properties at constant temperature do not encourage attempts to work with the added handicaps of changing temperature and reactively hardening material. Under such changing conditions the plasticity measurement has to be taken "on the fly". Furthermore, the properties of interest to the molding industry only manifest themselves under pressures of 200 to several thousand pounds per square inch. Therefore, the lag of the molding industry in respect to scientific plasticity measurements can be readily understood.

Viscosity is a single property, expressed in terms of the force required to keep the liquid flowing at a given rate. Plasticity is a double property which may be expressed in terms of (a), the force required to start flow, and (b) the force required to keep the plastic mass flowing at a given rate. The plastic measurements on the apparatus here described do not attempt to separate the two types of flow resistance.

Theoretical

A number of types of measurement have at various times been attempted, with, naturally, varying degrees of success. The problem is one of great complication if treated in more than an empirical manner, as may be shown by the following considerations:

1. A chemical reaction which hardens the plastic mass begins to take place as soon as the mass, or the outside portion of it, has melted.
2. The softness of the mass, or any portion of it, initially increases with the temperature.
3. The rate of hardening of the mass, or any portion of it, increases with the temperature.
4. The mass of material under test, being heated from the outside, naturally hardens first on the outside, and therefore the inside may be still in the reacting stage while the outside is fully set.
5. The mass must be in motion while being tested, therefore any lines of heat flow which might be postulated from mathematical

analysis, and which do not consider the lines of plastic flow and the changing shape of the mass, are immediately upset by the motion of the material.

6. Since molding compounds never become true liquids, the pressure is not hydrostatically transmitted to all portions of the mass and is therefore unevenly distributed.

7. The mass being tested is in a cavity which constantly changes shape, although only in one dimension, as the pressure follows up the flowing compound.

8. The mass sometimes contains some water associated with resin or filler, which may be expected to be immediately vaporized in contact with the hot mold, the temperature of which is always well above 100° C. This steam will be driven into the cold

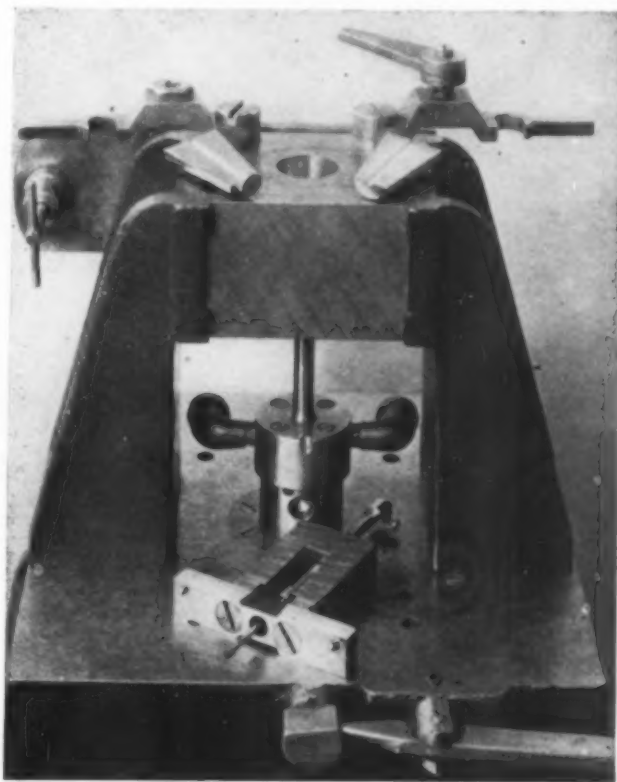


Figure 1—Close-up of flow tester body, showing the steam chest, ram, split cone and a molded test specimen.

interior portions of the mass being tested, thereby acting as a heat carrier, independent of the normal process of conduction.

9. The hardening reaction sometimes liberates a gas, which may act as a plasticizer.

10. The resistance to plastic flow consists of two parts: (a) the friction of the material sliding over the mold surface, and (b), the friction of the various particles sliding over each other. The first portion of the friction, (a), may be expected to exhibit radical changes as the plastic mass goes through the various stages of its reaction. The second part of the friction, (b), may be divided into two portions; one of these is the internal friction of material which is melting or about to melt, which is decreasing; the other is the internal friction of material which has begun to harden, which is increasing.

11. To make a worthwhile test the mass to be tested should be compressed between forces as in actual molding practice. Furthermore, if not compressed between forces, the top of the flowed column of material would be of different density from the bottom and more or less soft and fluffy, preventing the possibility of correct measurement of length and resulting in unreliable values.

These eleven items, which might be extended, suggest how complicated is the action in any one test mold during one test of a

single material. Below are noted some of the complications which arise in a comparison of different materials:

1. Filler and coloring material affect heat conductivity; therefore two compounds using equal proportions of the same resin may actually behave differently, because the one of greater heat conductivity heats through faster and therefore finishes its reactions sooner.

2. The water which is always present affects both the softness and the setting rate of the resin, and because of the large variety of resin types, cannot be expected to affect all of them in a similar or even in a proportional manner.

3. Plasticizers or lubricants are often added to molding compounds, and whereas one plasticizer may have its effect largely on the internal friction, the other may have its effect largely on the external friction.

Other Methods

Many methods have been tried in evaluating the plastic properties of hot-molding compounds. One of the most favored has been that of molding a cup. The cup has taken various sizes and shapes, generally with conical side walls of uniform thickness and varying from about 1" height to 3" or more. Diameters range from 1-1/4" upwards, according to the fancy of the designer, the available press, similarity to a troublesome commercial piece, etc. The cup mold used is ordinarily a hand type, either flash or positive, usually operated under fixed conditions of temperature, pressure, charge, etc., and the time necessary to form the piece, or "close the mold," is taken. Sometimes also the cup mold may be directly steamheated and operated as a semi-automatic.

Such a design also lends itself to the determination of minimum molding time, an important property believed to be connected with the plasticity, although in no sense a measure of it. The measurement of closing time on cups is usually by stopwatch, and according to mold design, molding conditions, weight of charge, type of material, etc., may vary from 3 to 50 seconds, or thereabouts.

Next, in popularity, comes the overflowing disc. A simple telescoping positive mold, for making a disc, is arranged so that a portion of the charge may escape during the molding operation. Molds of such design have usually been made in diameters varying from 2 inches to 5 inches. The usual overflow means is a groove along one element of the plunger. Sometimes several grooves are used. The operation is to charge with a chosen fixed weight, and mold under fixed conditions. The resulting disc, after removal of fins and extruded material, is weighed again. The rating of the material may be taken arbitrarily as the remainder weight in grams, the extruded weight in grams or the remainder weight in per cent. The value of this type of measurement is in habitual correlation between actual flow as observed in commercial molds, and the resulting figures of the extrusion test.

Such a test has also been operated using a 5" diameter mold so arranged that extrusion from the center of the disc might take place. In other instances extrusion from the disc has been through an orifice in the side of the chase. In either case, the extrusion ribbon may be cut off at various intervals and the extrusion weights for each interval determined, or the time required for the material to appear at the outer end of the orifice may be taken.

Still another type of flow measurement has been to mold a fixed quantity of material, unconfined at the edges, between two parallel plates. The material may be either in powder or tablet form. The result of such an operation is a disc of random diameter but uniform thickness, which is soft, friable, and porous at the edges, but firm and solid at the center. The usual measurement is the estimation of the diameter of a circle whose area would be equivalent to the dense portion of the disc. The

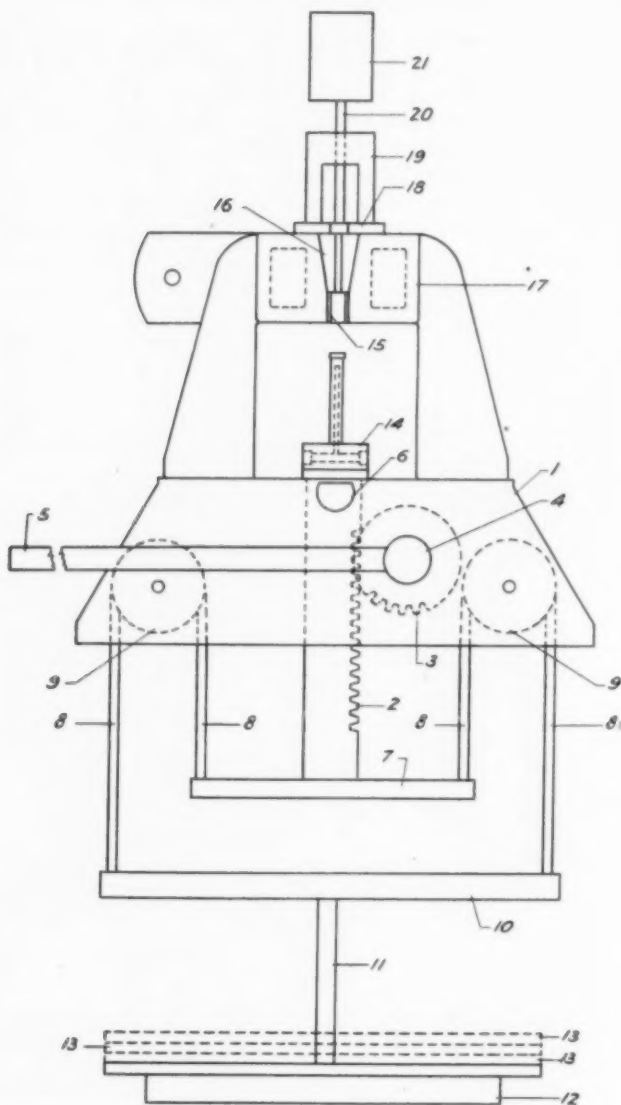


Figure 2. Flow tester outline drawing showing arrangement of parts for molding.

diameter may be converted to area, and using the thickness, to volume. The weight may also be taken.

An article published in Germany (Krahl, *Elektrotechnische Zeitschrift*, 14, Apr. 2, 1931, p. 439), describes a different method. A tablet of material is forced into a long orifice. This orifice is circular at first, to accommodate the plunger, then suddenly changes to a rectangle of much smaller area. The rectangular section of the orifice tapers off along one of its dimensions but remains uniform along the other, thereby molding a long slender wedge. In such a molding operation the material, which is already hot and reacting, is being formed under varying pressure, and further is being more and more compressed and tightened as it wedges into the space provided. This undoubtedly requires more pressure than were no further distortion of the material attempted after it had been forced into the tube and had there reached a hard or semi-hard condition. Krahl gives some later data (*Ibid.*, June 25, 1931, p. 850) regarding the effect of mold finish and mold lubrication on his measurements.

Plasticity measurement is also made in multiple cavity production molds so operated as to determine, using a constant load in pounds on the mold, the maximum number of pieces which can be filled out and properly cut off. The result may be expressed in terms of number of cavities filled, pounds load per cavity required, or molding pressure in pounds per square inch required. This method has the valuable feature of duplicating commercial molding operations. Care must be taken, however, to see that the various cavities are alike in volume, fin clearance, etc. A disadvantage of the method, in some cases, would be the size of press required, but, on the other hand, an important advantage is the fact that pressure adjustment is ideally accomplished without the aid of any special devices, such as hydraulic reducers or adjustments of accumulator, simply by varying the number of cavities loaded.

General Description

The type of machine about to be described includes a special arrangement of a mold and press, built as one unit. The central feature is a vertical tube $\frac{1}{8}$ " diameter and $1\frac{1}{2}$ " long into which the test material passes from the bottom. This hole may be machined in a steel cone which splits axially, for convenience in cleaning. The cone when ready to operate is clamped down into a steam-heated chamber which it fits accurately. At the bottom of the $\frac{1}{8}$ " hole in the cone, and, concentric with it, is a steel bushing $\frac{3}{8}$ " inside diameter by $\frac{3}{4}$ " long, which constitutes the "chase" or main chamber of the mold. Within this bushing, a close-fitting ram is so arranged as to thrust the material being tested against the bottom of the cone and force it to flow up through the $\frac{1}{8}$ " hole therein. A photograph illustrating the steam chest, the ram, the split cone and a molded test specimen, is given in Fig. 1.

Other features of the whole machine, which has been named "flow tester," are means for applying weights to provide adjustable molding pressure, means for controlling the heating, means for observing, measuring and recording the amount of material which flows, and means for measuring temperature.

In the control of temperature, it would be possible to choose either steam, gas, electricity or oil as the heating medium. Steam is considered ideal for molding work, largely on account of its latent heat, and was therefore chosen for the flow tester. It has been found also that temperature, using steam heat, may be very simply and almost ideally controlled by means of almost any of the simple, rugged and sensitive pressure reducing valves on the market. Saturated steam also covers well, at nominal pressures, the temperature range within which reactive synthetic

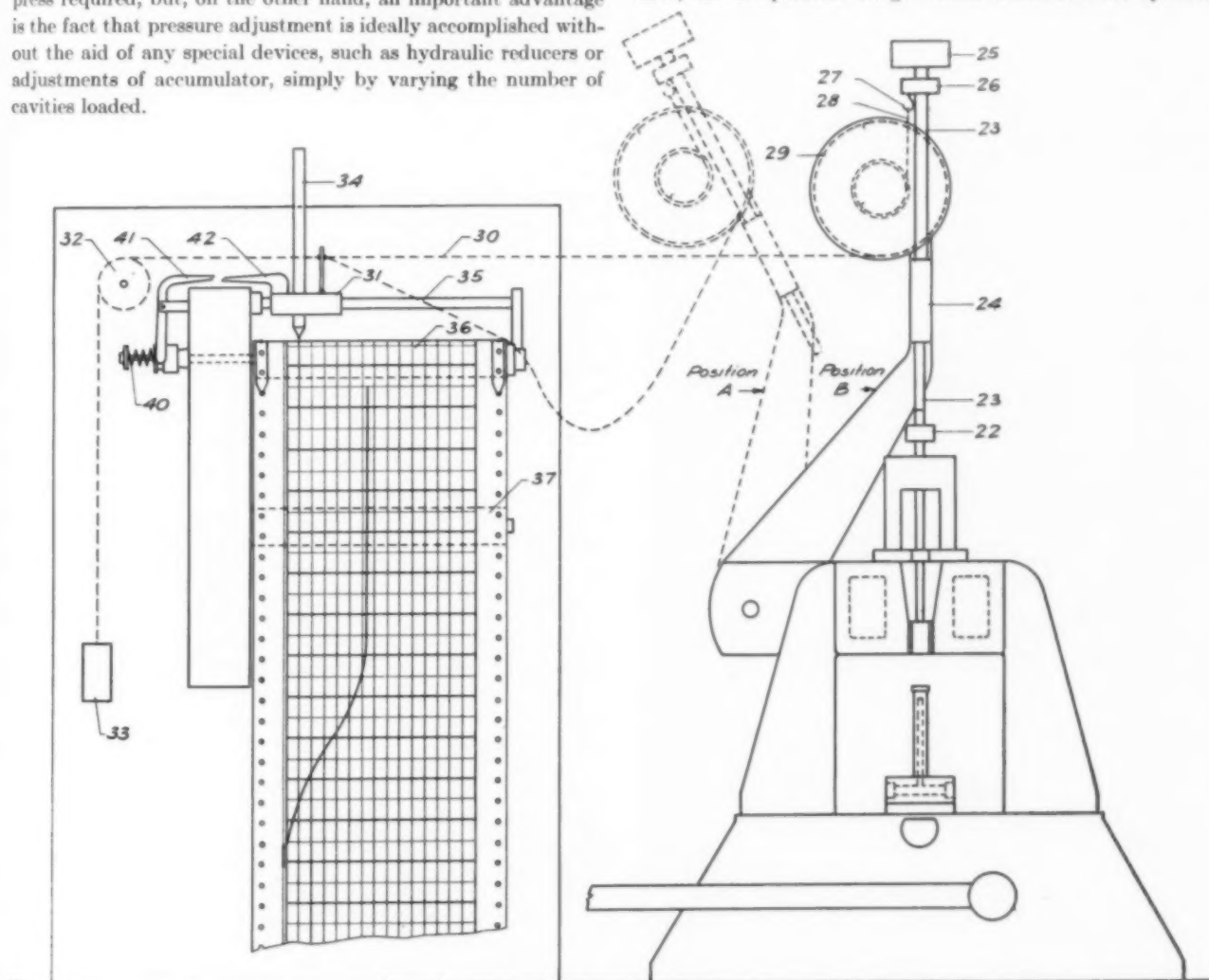


Figure 3. Flow tester outline drawing showing arrangement of parts for recording

compounds are usually molded, that is, from substantially 130° C. to substantially 185° C.

Time, the other main variable of molding, is in general governed by the action of the test material under the chosen conditions. For example, if a test is made at chosen pressure and temperature, the time of flow is largely determined by the character of the material.

Design Considerations

It was felt originally that the machine must be subject not only to accurately controlled pressures, but pressures that were also accurately measurable. The ordinary type of hydraulic press was not considered satisfactory, because in the first place, for testing purposes constant pressure is required at whatever adjustment may be desired, entirely free from pulsations due to pump strokes, water hammer, sticky or jerky accumulators, or the like. Exact constancy of hydraulic pressure is something not generally required and therefore unavailable for press work, and at the time of starting the flow water tester design the other possible sources of constancy, such as compressed gas cylinders, hydraulic reducers, etc., were not considered, for one reason or another. Secondly, the hydraulic pressure itself must usually be measured on a Bourdon-type gauge, which is notoriously inconstant even in the best grades.

In the third place the hydraulic press must incorporate a gasket, usually so arranged that the water pressure presses the edge of the gasket firmly against a metal surface. As the press operates, leather at high unit pressure is dragged over a metal surface, thereby causing a certain amount of friction. This friction would act against the press operation but its amount would be large and indeterminable.

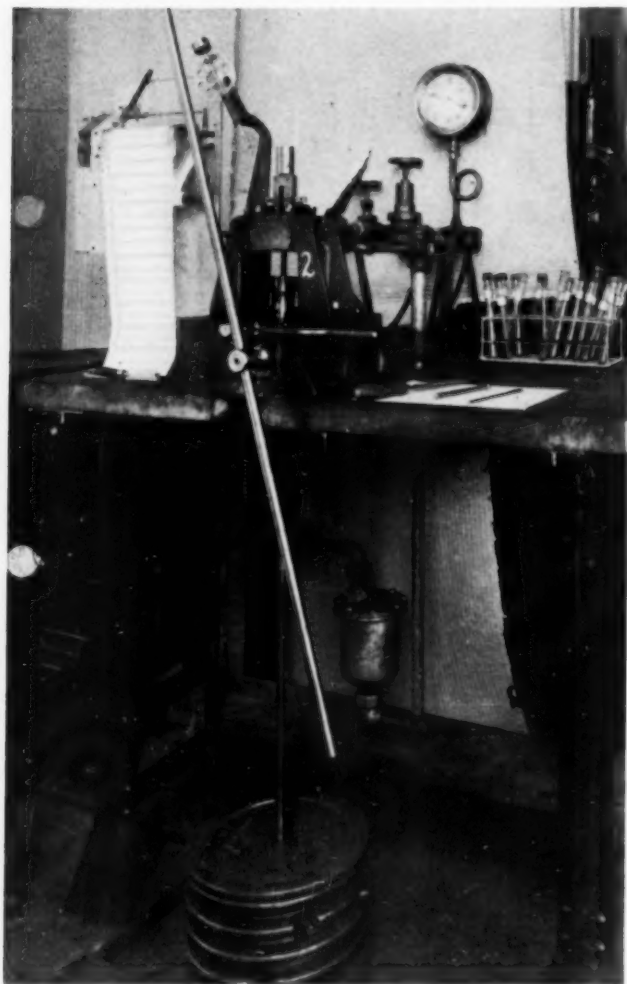


Figure 4. Complete flow tester ready for operation

It seemed best therefore to choose weights for supplying the molding pressure, since gravity could be depended on to be constant, and also since the friction of a weight-operated device could be accurately measured and compensated. Weights are ideal for furnishing accurately constant pressure of any chosen amount. By various trials and calculations the relative diameters of the charge chamber and flow tube were chosen, also the length of stroke, size and number of weights, and other details. Once the machine was in operation various opportunities presented themselves to check its story with actual molding performance on commercial pieces. As the work proceeded, improvements, refinements and additions were made until the machine arrived at its present stage of development.

In redesigning from the first trial machine, the central features of the design, corresponding to the mold, were retained exactly, but the operating features, corresponding to the press, were changed radically. Proper attention to detail of design, and particularly to condition of molding surfaces, will permit checking with good accuracy between the various machines.

The inherent feature of reactivity with heat, in all types of material molded by the process used in the flow tester, is such that an unchanging reference standard would be impossible. Therefore the only feasible method of checking machines is to maintain each in the best possible mechanical condition and consider that when several machines give the same values they are reading correctly. Ordinarily, bad mechanical condition gives low flow values, but excess lubrication of molding surfaces can give high values. Permanent low values are usually caused by worn and roughened condition of the flow tube in the cone, but temporary low values may occur due to the mold-poisoning effect of the material molded just previously.

The usual molding operation carried out commercially applies something more than enough pressure to close the mold. In that case one measure of softness is the closing time, usually defined as the interval from first pressure on the material to complete mold closure. The flow tester may be operated in that manner. It is better, however, to apply less than enough pressure to close. This results in flowing variable amounts of material into the $\frac{1}{4}$ " tube, and indicating the flow by the amount of material displaced. The two methods are, either to use a relatively high molding pressure and force the material to a definite amount of flow, measuring the time required, or to use a relatively low molding pressure and allow the material itself to govern the amount of flow, using the amount of flow as the measurement. In the first case, the measurement covers only the first part of the flow; in the second, the entire possible flow is measured.

Design Detail

Figure 2 is an outline drawing made solely to explain the operation. It is therefore not to scale. Referring to Fig. 2, 1 is a box-type base in which a solid cylinder 2 slides vertically. On one side of the cylinder, rack teeth are cut, engaging with a gear 3. This gear is mounted on a shaft 4, which may be turned by the operator, using handle 5. The rack may be pinned in convenient positions by pin 6. At the bottom of the rack a bar 7 is fastened, which engages two chains 8, 8 passing over grooved idler pulleys 9, 9 within the base to weight-bar 10. From this weight-bar a weight-rod 11 supports a bottom-weight 12 and any desired number of operating weights 13 to provide molding pressure. These weights are slotted to the center to permit quick application to and removal from the machine.

At the top of the rack is mounted a ram 14, heated by steam channels from connections not shown. The operating weights force this ram up against the material in bushing 15. The material in turn pushes against, and as it melts flows into, cone 16. Holes not shown here are drilled in this cone, parallel, to the elements, for insertion of thermometers. This cone is tightly held down in the steam chest 17 by strap 18, which in turn is held down by latches not shown here (see Fig. 1). Strap 18 carries a yoke 19 in which is a guide bearing for first follower rod 20. At

the top of the first follower rod is a weight 21, which serves to hold down and slightly compress the upper portion of the flowing material.

The operations of a test are as follows: The desired temperature and pressure are adjusted. The ram is withdrawn below the steam chest and a tablet of the material to be tested placed on its top. The operator then allows the weights to raise the ram and tablet into the charge chamber, and lets go. The material goes through its cycle of melting, flowing, hardening, and setting, and then in the form of a molded piece is removed by the operator and measured.

The above describes the press and mold parts of the Flow Tester. Figure 3 shows an important part of the apparatus which records graphically the distance-time relationship, by means of which the speed of flow of the material at any instant may be obtained.

In Figure 3, first follower-rod weight 21 shown in Figure 2 is replaced by first follower-rod collar 22. Resting on top of and in alignment with the first follower-rod is second follower-rod 23, guided in a loose bearing in swing arm 24. Second follower-rod weight 25 serves as partial replacement of the first follower-rod weight, the balance being made up by the rest of the recording mechanism. Second follower-rod collar 26 carries a hook 27 to which is attached a chain 28 passing partly around and fastened to the smaller diameter of two-step grooved pulley 29, which has a 3 to 1 ratio. This pulley, free to turn on its bearing mounted in the swing arm, is connected on its larger diameter by a separate piece of chain 30 to pen slide 31. The chain continues on over pulley 32 to counterweight 33. The pen slide carrying pen 34 is free to rotate and slide on pen slide shaft 35, which is mounted on the frame of chart drive roll 36. The paper from roll 37, which is ruled 4.50" wide to correspond with actual flow distance in the cone of 1.50", is fed at 6 inches per minute over the chart drive roll, which in turn is driven from clock 38 through cone clutch 39. The cone clutch may be opened against the closing action of spring 40 by depressing clutch finger 41. The clutch finger may be held depressed by pen slide finger 42 when the pen is in the extreme left-hand position.

The general operation of this system is as follows: Swing arm, which has been in position (a) to permit removal of yoke and cone for cleaning, is moved to position (b), in which it may be locked by a pin not shown. The lengths of chain have been so adjusted that at the lowest position of the first follower-rod, the pen stands on the recording chart at a point .09" to the left of the chart line on which the record always begins. The clutch finger and pen slide finger are so designed that when engaged a motion of the pen of .09" will disengage them, thus permitting the clutch to close and instantly start the chart at the exact moment the pen comes up to the zero line.

To set the pen for beginning a test, the ram is removed from contact with the first follower-rod, and the clock is started and allowed to drive the chart through closed clutch until one of the time divisions of the chart comes up to the pen. At this moment the clutch finger is depressed, stopping the chart, and engaged under the pen slide finger. Clock continues to run idle. Ram is depressed, tablet loaded, and operating weights allowed to raise tablet against the bottom of first follower-rod, which projects below the cone .03" and therefore, by means of the 3-to-1 ratio pulley, drives the pen the .09" necessary to bring it up to the zero line, at the same time disengaging the clutch finger. At the moment when bottom of first follower-rod has raised level with the bottom of the cone, the chart starts and the pen simultaneously begins to be pulled across it at right angles to the chart motion, at a speed governed by the action of the material. This pen record is made with time and distance axes at right angles, therefore the slope of the line is speed.

The reason for using a clutch to start the chart suddenly is that the starting inertia of this type of clock mechanism is large compared with the power of the spring which drives it. If the chart and clock together had to be accelerated from standstill after flow had begun, the time reading from the chart paper would be in error due to the slow starting.

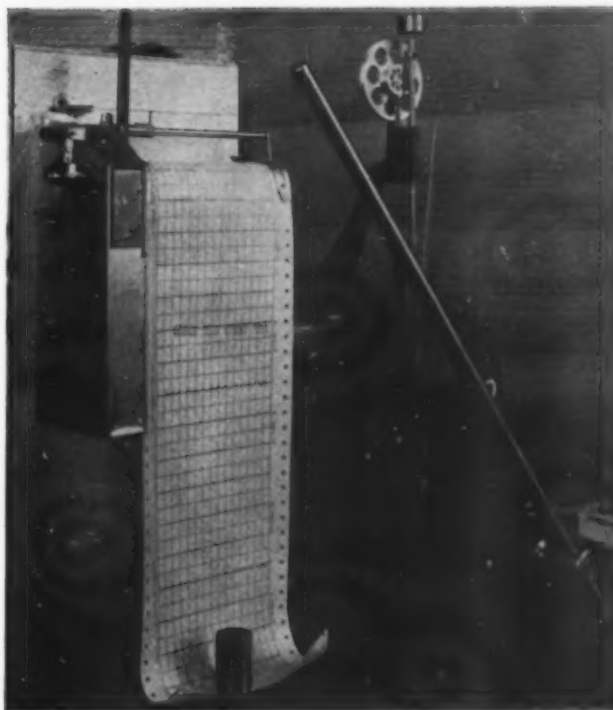


Figure 5. Flow tester recording mechanism

Fig. 4 is a photograph showing one of the flow testers as it is used, set up on its own bench. A closer view, showing in more detail the recording mechanism, will be found in Fig. 5.

Parts II and III of this article will describe the tests produced by the flow tester and their applications.

Lacquers and Varnishes for Railway

Practical experience in the painting of railway rolling stock has shown pigmented lacquers not only to be cheaper, but also to have much greater protective power than clear varnishes. Many short-period tests with quick-drying paints on tung oil undercoating have shown that a few thick layers give better protection against rust than a larger number of thin coatings. A lot of work has been done with nitrocellulose varnishes, using either cellulose or linseed oil ground coatings. In earlier types of these varnishes a film was obtained after drying, in which little change took place; but with the newer kinds a small residue of solvent is retained for some considerable time, so that internal tension is reduced. In the painting of freight cars, the soda test, or soda-resistance test, has shown that linseed-standoil paints are better than tung oil paints.

Cellophane for Determining Humidity

In *Die Naturwissenschaften* recently there appeared an interesting discussion on "The Use of Cellophane for Determining Humidity." One of the basic properties of cellophane is this material's permeability to water vapor, and it is suggested that in factories where it is necessary to know the degree of humidity for the efficient working of a process, and where the ordinary hygrometer is rapidly corroded or rendered useless by dust, the hygrometer could be enclosed in a cellophane sheath, which allows water vapor to get through quickly, but prevents dust and corroding vapors passing through. Experiments have shown that hygrometers enclosed in cellophane give the same readings as those that are not. Cellophane is hygroscopic and, as it is thin and permeable to water, reacts quickly to changes in humidity, and is therefore suitable for the manufacture of weight hygrometers. When exposed to dampness cellophane alters in length and strength.

Applications of "Acetate"

A Review of Typical Uses of this Molding Material

By Spencer Palmer

CELLULOSE acetate molding composition, being higher in price and lower in resistance to heat than the phenolic or urea resins, has been and still is a material for special uses. To illustrate such uses of cellulose acetate molding composition, a table has been prepared of typical articles made from Tenite—produced by the Tennessee Eastman Corporation—a relative newcomer in the plastics field, whose plant is situated at Kingsport, Tenn. This molding material is made from cellulose acetate emerging from the same process as cellulose acetate for use in safety film and in acetate yarn.

An examination of the table, which indicates for each application of cellulose acetate molding composition which qualities made its use desirable, reveals under the heading of "Product Advantages" that appearance and strength have been important considerations in the case of nine of these uses typical of a cellulose acetate molding composition, and that resilience and finish have been important factors in three different applications each.

Cellulose acetate molding composition is frequently chosen for several of the advantages peculiar to it, but in the table presented with this article only the most important considerations in each case have been checked.

Factors in "Appearance" are the bright and attractive pastel shades and transparent colors available with this type of plastic, together with clear transparent and together with endless combinations of two or more colors in various types of striations and variegations.

Strength in resistance to impact, combined with the resilience characteristic of cellulose acetate molding composition, is the quality that leads to its adoption for articles that must not be

ruined by accidental mishandling, dropping, or breakage by mechanical stresses.

Physical Qualities of Cellulose Acetate Molding Material*

Specific gravity.....	1.27 - 1.37
Density: molded piece, oz. per cu. in.....	.73 - .79
Specific volume: cu. in. per lb.....	21.9 - 20.2
Strength:	
Tensile: lbs. per sq. in.....	4,300 - 5,000
Compressive: " " " ".....	12,000 - 16,000
Transverse: " " " ".....	6,000 - 7,000
Impact: Izod test, ft. lb. per sq. in.....	.5
Hardness: Shore test (pure lead 2; quenched steel 100).....	55 - 60
Electrical properties:	
Dielec. strength: 60 cycles, volts per mil.....	700 - 800
Dielec. constant radio frequency, 550 kilocycles.....	4.6 - 4.7
Elongation: per cent.....	30 - 35
Water absorption: 24 hours—per cent.....	1.4 - 1.7
Softening Temperature: Fahrenheit.....	140 - 160
Compression ratio: vol. granular comp. to vol. molded piece.....	2.5 : 1
Molding temperature: Fahrenheit.....	280 - 320
Molding pressure: lbs. per sq. in.....	2,000 - 3,000
Mold shrinkage: lineal in. per in; cold mold to finished article.....	.002 - .003

*These figures are based on medium-flow TENITE and include types ranging from those containing only dyes to those containing pigment as a coloring agent but not as a loader or filler.

QUALITIES OF TENITE ACCOUNTING FOR ITS USE IN TYPICAL APPLICATIONS

Article	Product Advantages				Manufacturing Advantages						
	Appearance	Resilience	Strength	Dielectric Strength	Sound Finish	Reproducing Use of Injection Qualities	Molding Process	Drilling Properties	Punching	Riveting	Preheating
Automobile Hardware	X	...	X	...	...	...	...	...	...	...	X
Beer Swipers	X	...	...	...	...	...	...	...	...	...	...
Cine Film Cores	...	...	X	...	...	...	...	...	...	...	...
Combs	X	X	...	...	...	...	...	...	...	...	...
Commutator Part	...	...	X	X	...	...	X	...	...	...	...
Fishing Reel Ends	X	...	X	...	...	...	...	...	...	...	...
Goggle Cups	X	...	...	...	X	...	...	...	X	...	...
Ice Box Part	X	...	X	...	...	...	...	...	...	...	...
Knife Handles	X	...	...	...	...	...	...	...	...	X	...
Medical Device	...	...	...	...	X	...	...	...	...	...	...
Pencils	X	...	X	...	...	...	X	...	...	...	...
Phonograph Records	...	...	...	...	...	X	...	...	...	...	...
Spools	...	...	X	...	X	...	...	...	...	...	...
Switch Housing	...	...	X	...	...	...	...	...	...	...	...
Tooth Brush Handles	...	X	...	...	...	...	...	X	...	...	...
Vibrator Combs	X	X	X	...	...	...	...	...	...	...	...

Under the heading of "Finish" are included the advantages of smoothness, high polish, and the low conduction of heat desirable to make molded articles pleasant to the touch.

At least one article has been selected for the table to illustrate the more important manufacturing advantages of this cellulose acetate molding material from the viewpoint of molding and the subsequent finishing of the molded pieces. A thermoplastic material offers a distinct advantage for injection molding, since, being non-curing and set by cooling, it makes possible loading of a pressure hopper with material sufficient for several injections of one or more molds without the necessity of cleaning out the pressure cylinder after each cycle. Drilling and punching are operations practically impossible to carry out with any other type of molding material without chipping and breaking the edge. Ability to resist the shock of riveting is another aspect of the resistance to impact combined with resilience and elasticity that characterize the product.

Although the use of preheated stock is marked on the table as a primary advantage only against the application of automobile hardware, it can be advantageously applied in any case where molding sheets or slabs are used as opposed to the material in granular form. When the material is used in this way, the limiting factor in the length of the cycle is largely a matter of the time taken for chilling, which can be made very short by proper channelling of the mold.

Despite the fact that cellulose acetate molding composition is slightly higher priced than cast resin, it is usually found that, if more than 5,000 pieces are to be made, molding them from acetate is cheaper than machining them from a cast resin. It is just a question of the per-piece saving absorbing the mold cost.

Another advantage is the possibility of very quick delivery in large or small quantities, with consequent elimination of lengthy waits by molders for material as well as reduction of the risk of obsolescence and of the amount of invested capital. This quick delivery is made possible by the fact that this material requires no period of aging. As a molding composition ready for use, it is entirely homogeneous and the texture of the outside of molding sheet is identical with the material in the center.

It is possible so to vary the features of this material in its original manufacture that any table of physical data has, to be all inclusive, to show a fairly wide "spread". A second table, showing some of the more important physical data of Tenite, appears with this article.

Titanium in Paper---And in Plastics

Significant experiments are under way with the use of titanium-impregnated paper as forming sheets for laminated stock, particularly with the urea-formaldehyde resins as binders. Up to 10% of resin is to be employed. Special qualities are expected to result from this application, the research for which has been going on for some time.

From the time of the first use of artificially produced titanium dioxide as pigment in 1910, and even from that of the original service of a double salt of titanium for mordanting leather in 1901, an increasing amount of inquiry on its properties has been conducted. Titanium pigments are probably the most recent development in the paper industry. Where high opacity, "hiding-power," and durable neutral white effects are essential, recently shown advantages from titanium in this field seem to point to increasing use. TiO_2 is finding new applications in paints, coatings, rubber and cosmetics, while considerable application in the phenol, casein and urea plastics—in about the order given—is being made.

Titanium produces the most opaque white pigments known. They are extremely inert and will withstand strong conditions of exposure without alteration or discoloring. A leading paper technologist has expressed his opinion that one pound of pure titanium dioxide is equal to 16 pounds of clay in opacifying effect. This is due to its index of refraction of 2.55 against 1.55 for china clay. From their high light reflective values, they brighten up the sheet as well as increase the opacity and also

have an influence in making uniform variations of mottling of fiber in the resulting stock. From measurements by Bausch & Lomb Opacimeters, paper in general shows an average increase in opacity of nearly 12% for titanium over clay, with notable but somewhat lower increases in both magazine and bond paper.

Clearer effect for half tones and other printed matter results for paper thus treated as well as better printing surface and body for color work. Because of increased opacity the magazine "Fortune" has been printed since the first of 1932 on paper prepared with Titanox-B, a product of Titanium Pigment Co., Inc. "Fortune" uses for its offset and gravure advertisements and for text paper, a watermarked antique paper, the opacity of which is obtained through the use of titanium pigment. This stock is made by The Merrimac Paper Co., Lawrence, Mass., and The Curtis Paper Co., of Newark, Del. From the advantages of these unfamiliar uses of titanium in the paper and in the plastics fields it may be expected that its relatively low cost in paper production will add new advantages to laminated.

Insoluble Coatings from Air-Drying Resin Varnishes

Varnish coatings of the phenolic resin class can be insolubilized by a stoving treatment which completes the transition from the fusible (A) stage to the fully polymerized, infusible and insoluble (C) stage. Insolubility in alcohol, in particular, is a valuable feature of this type of coating. To achieve this result by drying at the normal temperature has not hitherto been regarded as practicable, but a recent new process claims to be able to conduct the polymerization in such a manner that the coatings formed shortly after evaporation of the solvents are not only free from tackiness but are substantially insoluble in ordinary solvents. Apparently the finished varnish contains the fully polymerized resin very finely dispersed throughout the solvents, although the clarity of the product gives the impression of a truly colloidal solution. By prolonging the condensation beyond the fusible (A) stage until a cold sample is insoluble in alcohol and then continuing polymerization while dissolved in medium boiling solvents until a further test reveals good progress on the way to complete polymerization, the reaction can be stopped before actual gelling occurs. Anything in the nature of gel-formation would, of course, upset the fine distribution of the polymeric throughout the liquid. An empirical test which is recommended for detection of the danger point consists in noting the degree of penetration of the cooled mass into a standard paper. Kraft paper of 5 mils. thickness is specified, and the point at which polymerization should be discontinued is indicated when a sample adjusted to about 50 per cent. film weight and a viscosity of 500 centipoises at room temperature either does not penetrate the paper at all or is only absorbed to a slight extent. In making a straight phenol-formaldehyde varnish, the employment of hexamethylenetetramine as a catalyst is proposed. One thousand parts phenol, for example, are warmed with an equal weight of 40 per cent. formaldehyde solution and one part of catalyst. After eliminating the aqueous layer by distillation or any other convenient method, heating is continued until the mass is partially insoluble in hot 95 per cent. alcohol. Although this represents transition to some extent beyond the fusible A stage, the heating process is not discontinued, but is allowed to proceed for a further 12 hours with the mass dissolved or dispersed in a mixture of 400 parts butyl alcohol and 400 parts amyl acetate. Loss of expensive solvent mixture is avoided by operating with a reflux condenser. Apart from the paper penetration test outlined above, the increasing viscosity of the solution forms a good measure of the advance towards complete polymerization. At the appropriate moment the hot mass is thinned with a further quantity of solvent mixture and is then ready for use as an air-drying varnish.—*Synthetic and Applied Finishes.*

Chemical Tests for Transparent Papers

THE types of film on the market today in Great Britain are three in number, namely, *gelatine* films made from bone gelatine, *viscose* films made from wood cellulose, and *acetate* films made from cotton cellulose. Gelatine and viscose films cost about the same, but acetate films cost about double. They are advantageous, however, in that they are resistant to moisture, oils, fats, benzine and dilute chemical reagents. Films of the cuprammonium variety are not at present marketed here, so far as we are aware, although they are being produced in Germany by the J. P. Bemberg Company and may reach this country by indirect channels. Since it may be required to test such films as reach this country from foreign sources through indirect channels, it may be useful to give a list of the chief manufacturers and their products. The following is believed to be complete at the moment of writing.

In Great Britain, transparent paper of the viscose variety is manufactured by Messrs. Courtaulds, Ltd., and by the Transparent Paper Company Ltd., of Bury. British Sidac, Ltd. is on the point of starting up the old St. Helens rayon plant of the Nuera Company, and a further company has been floated for transparent paper manufacture at Wigton. Acetate film is manufactured at Spondon by the British Celanese, Ltd. The various products are marketed here under the names of Viscacelle (Courtaulds), Cetaphane and Neophane (Bury Transparent Paper), and Klarifoil (British Celanese).

In Germany the chief manufacturers of viscose film are Kalle and Co. A.-G., Biebrich a. Rh. (Cellophan), the Feldmühle A.-G., Stettin (Heliozell) and Wolff and Co., Walsrode (Transparit). The Lonza Elektrochemische Werke, Weil a. Rh., makes acetate film under the name of Ultraphan, while the J. P. Bemberg Co. manufactures cuprammonium film at Wuppertal and markets it under the name of Transphan.

In France, important companies are La Cellophane, Paris (Cellophane); Soc. Ind. de l'Acetophane, Paris (Acetophane); and the Soc. des Usines Chimiques Rhone Poulenc, Paris (Rhodiline, Rhodiod and Rhodoide). The former works the viscose process, the two latter the acetate.

In America, viscose films are made by the Du Pont Cellophane Company of Buffalo (Cellophane), and the Sylvania Industrial Co., Fredericksburg, Va., (Sylvania). Acetate film is made by the Tennessee Eastman Co., Kingsport, Tenn. (Kodapak), while a further type we have not mentioned, the *nitro* film, is manufactured under the name of Kodaloid by the Eastman Kodak Co., Rochester, N. Y.

Most other European countries have transparent paper plants working on one or another of the various manufacturing processes, and if satisfactory testing is to be carried on, a number of samples of the latest product of each maker should be obtained and

There is a growing market for transparent foil, in a variety of colors, mainly for use as a wrapping, and the increasing number of competitive papers marketed makes it necessary that interested parties should have some systematic method of testing these.

included in a special portfolio of reference. The behavior of samples under investigation when submitted to certain tests can thus be easily compared with the behavior of the standard samples, and deductions drawn as to the source of origin of the former.

When a film is submitted for investigation the first task is to determine the *type*, whether viscose, acetate, cuprammonium, nitro or gelatine. To this end a portion may be burned and its behavior noted. The following table

gives an idea of the behavior of the various types.

Type	Behavior	Smell	Ash
Viscose	Burns slowly	Burnt paper	Small quantity
Cupra	Burns slowly	Burnt paper	Small quantity
Acetate	Burns only in flame. Fuses	Acrid	Blistered carbon residue
Nitro	Burns rapidly	—	—
Gelatine	Fuses	Burnt feathers	Black fused mass

The action of the ash to litmus is acid in each of the synthetic types of film; alkaline in the case of gelatine.

Solubility tests may be applied as follows:—Acetate films are soluble in acetone and glacial acetic acid, while the nitrocellulose variety is soluble in an ether-alcohol mixture. A hot 10 per cent. solution of caustic soda rapidly dissolves gelatine films.

Among the most interesting are the reactions of these films to certain dyeing reagents, and for this purpose small quantities of the following three may be kept on hand:—

- (1) Zinc chloride-iodine solution.
- (2) Diphenylamine-sulphuric acid.*
- (3) A solution of 0.4 gr. rhodamine B extra and 1.0 gr. diamine pure blue FF per litre of water.

In (1) viscose and cupra foils dye bluish violet, acetate dyes yellow, while gelatine dyes yellowish brown.

In (2) all except nitro-cellulose foils are unaffected, this particular type, however, dyeing blue to bluish red.

In (3), which is a special reagent suggested by A. V. Schlutter, we have a very interesting means of determining whether a film is of the viscose or the cupra variety. According to this author, if the sample of film is placed at room temperature in reagent 3 for one minute, being afterwards washed for ¼ min. and dried at 80–100 °C., the viscose film dyes a shade between violet-rose and blue-violet. The cupra film dyes a pure blue.

The particular shade between violet-rose and blue-violet, to which the viscose film dyes, often forms a guide to the origin of the particular film, provided up-to-date standard dyeings of known brands are kept for purposes of comparison.

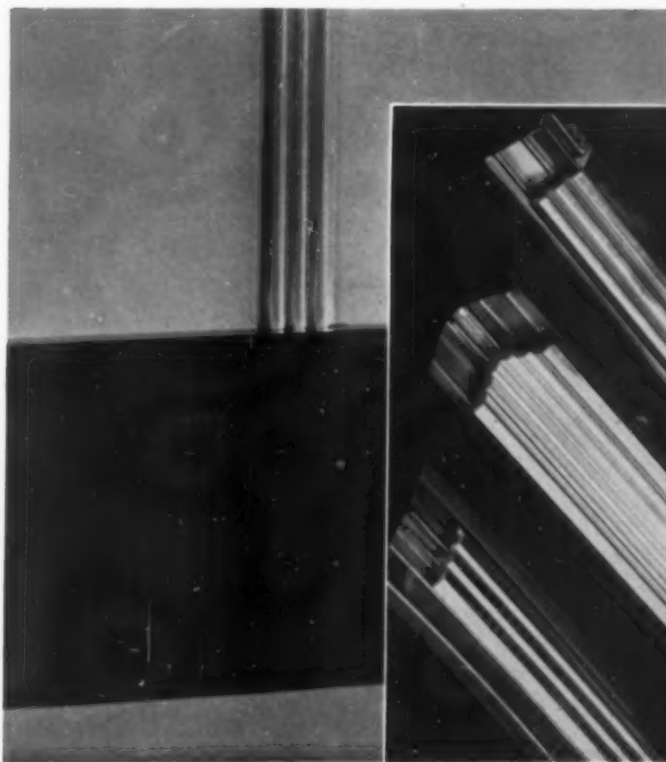
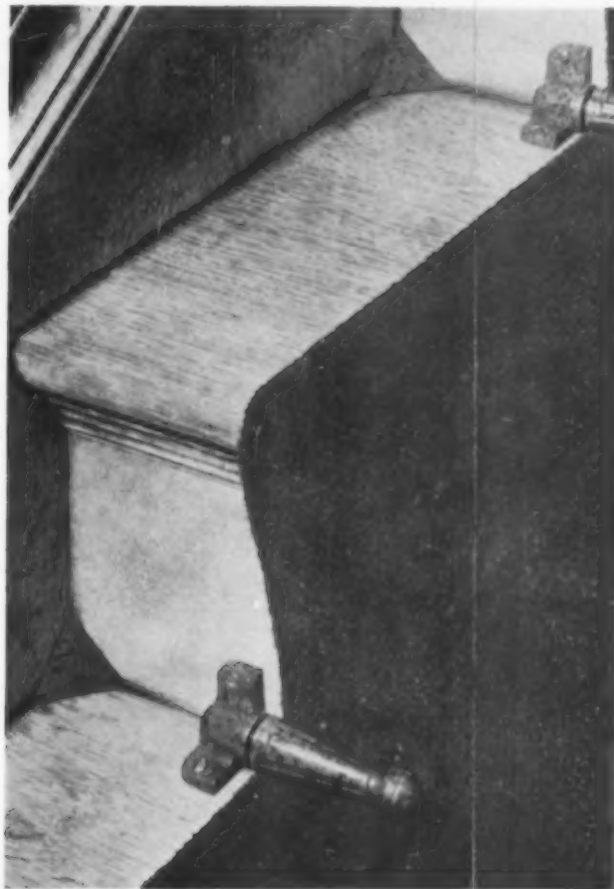
*Diphenylamine acid sulphate

Plastics in Pictures

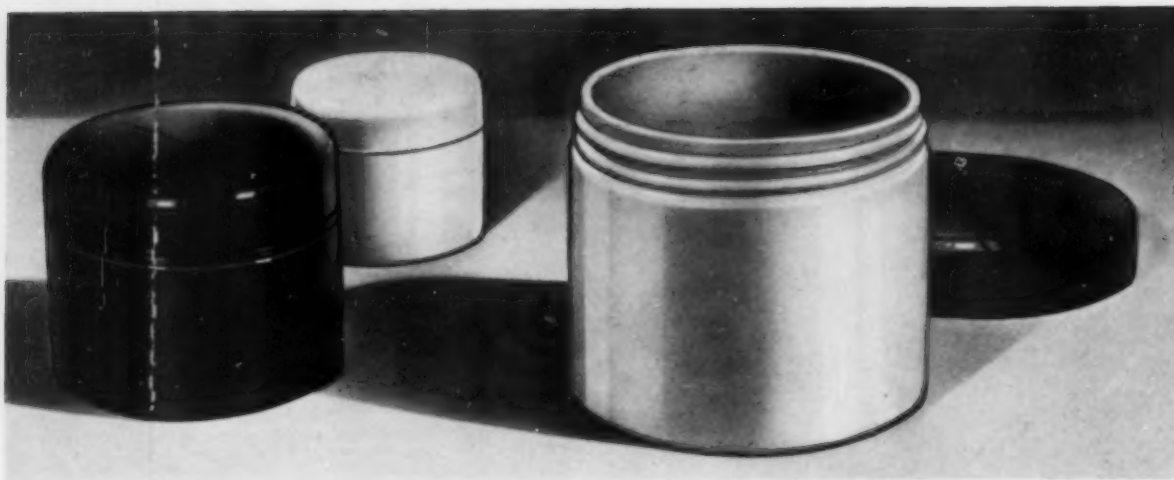


Modern washrooms will soon be equipped with this novel soap dispenser, a device that pulverizes a solid bar of soap by means of a spring pressure feeding the soap to the grinder. Of phenolic molded, which does not rust, corrode or tarnish; and introduced by Standard Pulverizer Co.

Something we have needed for a long time—the Banda stair carpet grip; a practical device made of Bakelite Molded in non-tarnishing and non-metallic effects. There are no springs; the grip slides easily into position, fits correctly in the angle, and therefore does not damage the carpet.



A new type of metal wall trim, especially adaptable to the mounting of Bakelite Laminated wall-board material, available in highly polished and satin effects, as well as colors. Installation can be achieved in three easy operations, and the result is an exceedingly pleasing effect, affording a fine contrast between the Bakelite Laminated sheet stock and the carefully designed metal trim. Trim by Wooster Products, Inc.



Smartness to the nth degree characterizes these sturdy jars, ideal for delicate face creams and similar products, molded of odorless, water-resistant Resinox, by Auburn Button Co.



Certainly a big step forward in contribution to office efficiency by Norman Bel Geddes and his team, simple yet effective by Mack Molding Co.

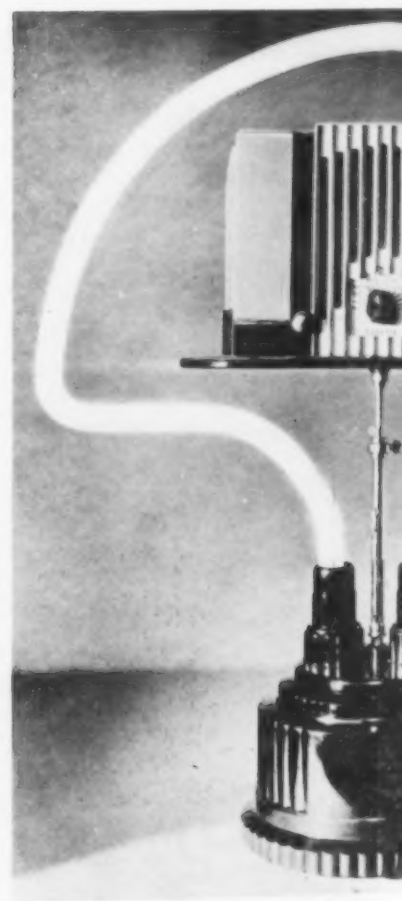


Life becomes easier every day for the housewife, plastic household utilities contributing efficiently to this boon. The Rotary Knife Sharpener, an attractive Bakelite Molded product, which comes in three shades—walnut, mottled red and mottled green.

Increasing sales by the aid of light and color, "Lights the Way to Sales," this extra device, consisting of lighted tubes mounted on a molded base, has recently been put into production by Light Manufacturing Co. The light colors, can be employed in various devices suitable for the display of radio merchandise.



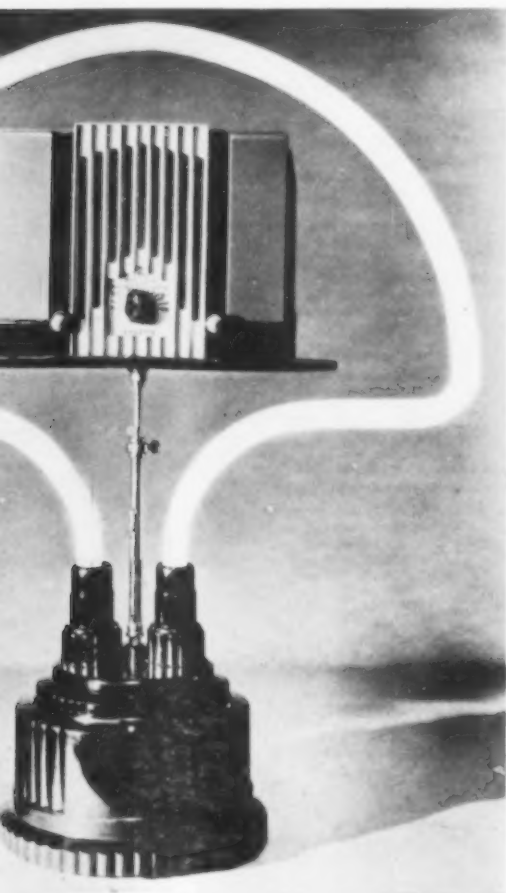
Time marches on, leaving in its wake new and alluring novelties. Here is an ash tray that should delight the heart of any hostess for it not only indicates the scoring for contract bridge, but also serves as a coaster for glasses and is equipped with a snuffer to extinguish lighted cigarettes. Tray has a handsome, lustrous finish and is announced by Appliancecraft, Inc.





...ly a big step forward in the plastic art and a worthy con-
... to office efficiency is this new telephone index, designed
...man Bel Geddes and produced by Bates Mfg. Co. The case
... index, simple yet elegant in design, is fabricated from Plaskon,
...ck Molding Co.

...y the aid of light and color. Coining a slogan, "It
... Sales," this extremely practical display device,
... tubes mounted on a sturdy, well-designed, Bakelite
... recently been put on the market by the Display-
...ing Co. The lighted tubes, in a wide variety of
... employed in various arrangements, making the
... the display of radios, clocks, or most any kind of

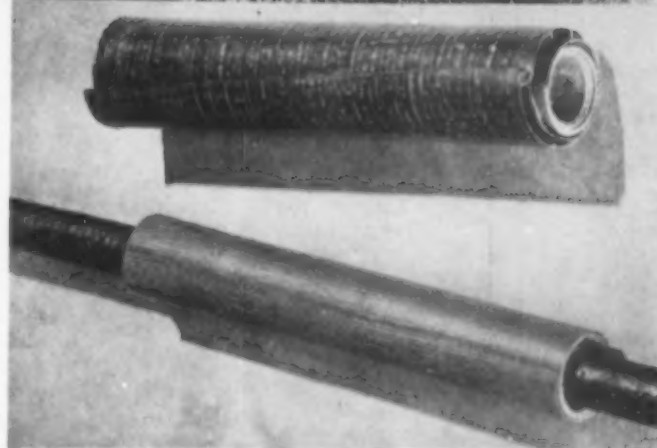


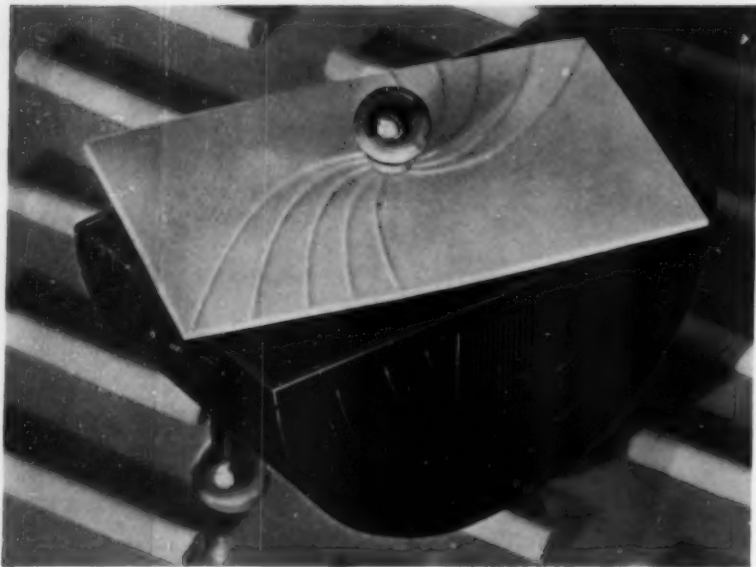
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only useful for auto-
mobile mechanics but
for anyone needing
direct and concentrated
light. Base of this de-
vice is made from Bake-
lite Molded, to which
is attached a piece of
punched Bakelite Lami-
nated. Reflectors are
made of non-tarnishing,
silverized metal to give
a strong and concen-
trated reflection. Bulbs
are of the long life fila-
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which can be put in
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nals are held securely by
screws to metal anchors in the
polished Bakelite Molded hous-
ing. Product of Universal
Microphone Co.*



*A new tree wire guard,
of Bakelite Laminated,
combining high dielec-
tric strength with re-
sistance to abrasion.
Has a flexible curtain
to inclose the wire with
several turns, for elec-
trical protection. The
remainder of the guard
consists of a hard, tough
Bakelite Laminated
shell, which completely
incloses the fabric
wrapped wire and pos-
sesses a constant grip-
ping action that main-
tains tightness of the
convolutions and pre-
vents longitudinal dis-
placement. Product of
Spaulding Fibre Co.*





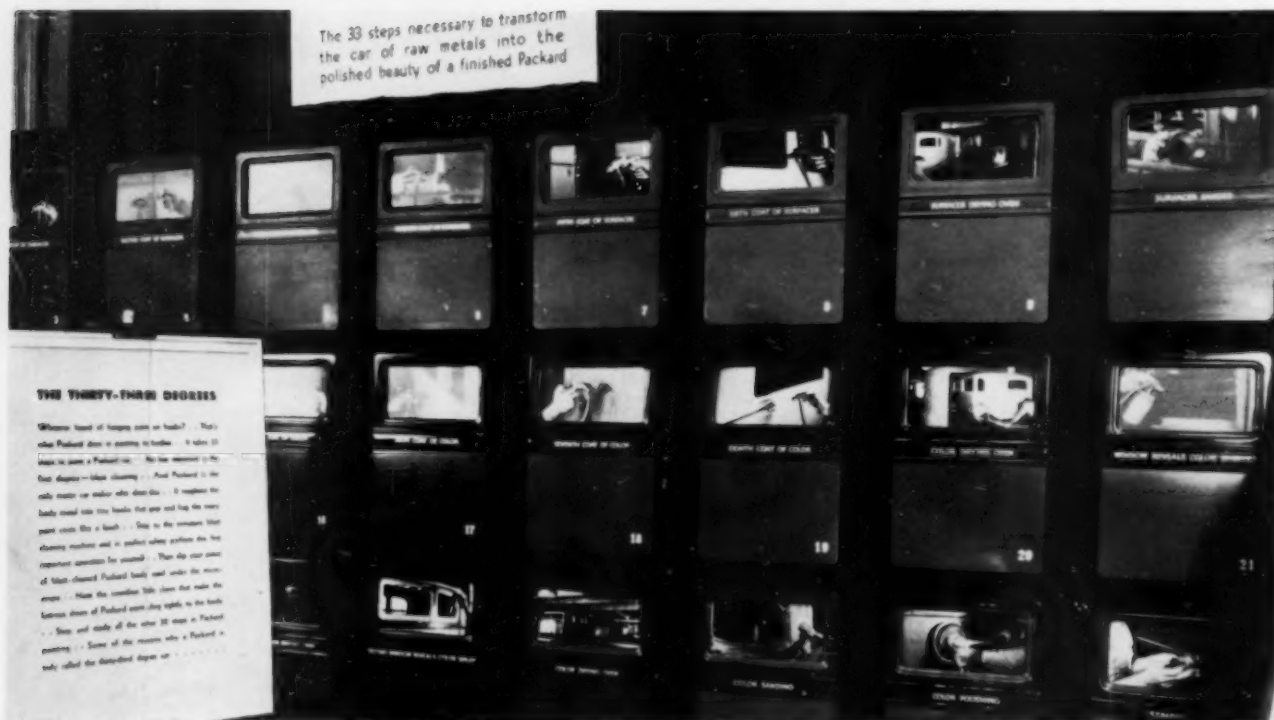
Cigarettes, plastics, and advertising—a three-fold purpose. In conjunction with Brown-Williamson Tobacco Corporation's campaign to introduce a new brand of cigarettes, company is offering this attractive humidor box for cigarettes, executed in green and black molded Textolite. Although General Electric has announced delivery of 100,000, Brown-Williamson figure that nearly one quarter of a million will be distributed during the campaign.



Plastic closures are fast winning high favor with all sorts of goods and the design at right shows a smart variation from the usual plain outline of molded caps.



Herbert Thompson Strong, nationally-known authority on color, was the guiding genius back of Packard's Salon of Color, outstanding sensation of the New York Automobile Show, and held in the Hendrick Hudson Suite of the Hotel Roosevelt. Thirty years ago Mr. Strong designed the interior of Packard's first closed automobile. The finish of that car, while beautiful in its day, would fare very badly in comparison with the exquisite and durable coatings employed today. Below, one section of the exhibit shows the 33 steps required to produce Packard finish. "Hung literally on little claws and hooks" is the way Packard engineers describe their method of obtaining finish durability. As many as eight coats of lacquer are used between finishing operations. Packard's masterful stroke of selling color to the public on a scale never before attempted by an industrial user of coatings has created widespread interest in the coatings industry.



Industrial Coatings

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How to Sell Color

An Interview with Herbert Thompson Strong
by Walter J. Murphy

COLOR has a great, almost universal appeal, that we all know. But how can that appeal best be turned into sales? That's a practical question for any coatings maker. And here is a practical answer.

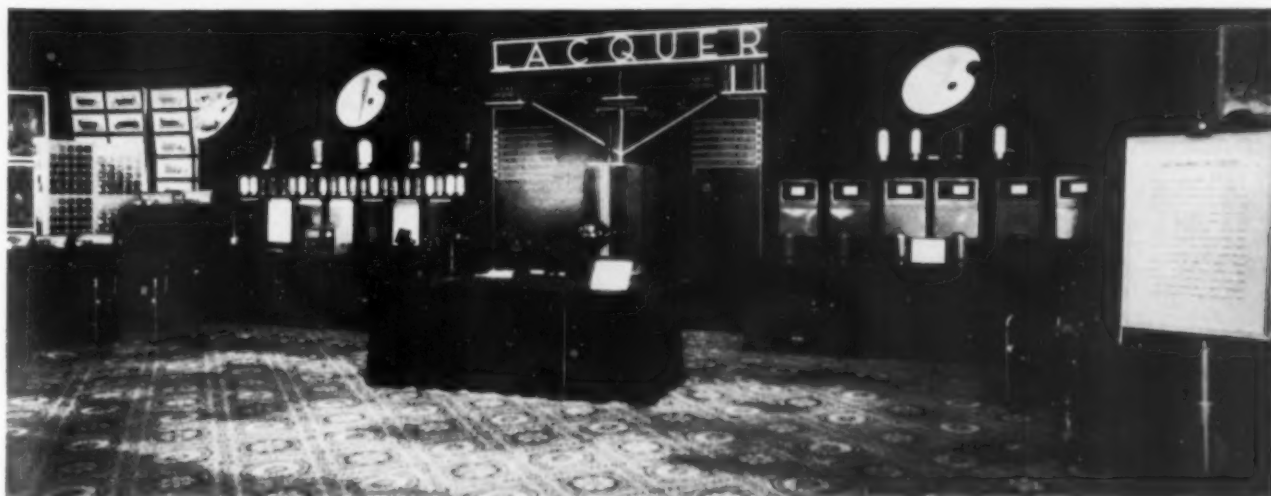
Packard's color salon—"The Realm of Color"—occupying the broad expanse of the Hotel Roosevelt's famous Hendrick Hudson Suite during the week of the New York Automobile Show was one of the outstanding sensations of a sensational week. Packard boldly stepped out and successfully "sold" color to the public on a scale heretofore never attempted by any car manufacturer. In a year when its competitors were placing the greatest emphasis on mechanical improvements and streamline design, Packard just about "stole the show" with color. It was an ambitious program flawlessly executed from the clever newspaper copy to the pretty hostesses of Park Avenue demeanor.

Coatings executives who were fortunate enough to have viewed the exhibit are discussing its possible adaptation and use

in other major lacquer fields and those who did not see it are asking questions. There are several suggestions how the idea born in Packard's directors' room might be employed by other industries, or by the coatings producers working collectively to stimulate further the use of color. In this day when one industry undertakes the job of selling the products of another, though a complementary one, then the "tail is wagging the dog" and that constitutes real news. Yet this is exactly what Packard did, most appealingly, for the coatings industry to enthusiastic thousands of New Yorkers and out-of-towners. That it sold Packards as well is good news for both Packard executives who had the courage to undertake it and lacquer companies fortunate enough to enjoy Packard business.

Packard, oldest and largest fine car maker, admirably succeeded in subconsciously impressing the visitor with the substantial character of its product. By its size, by its completeness, by its rich but conservative tone, Packard's color salon silently but most eloquently bespoke Packard standards. Packard cars, done in colors the "immortals" might have chosen, were simply back "prop" for the fascinating colorful display of the mysteries of fine car making.

The visitor entered the New York exhibit from the Roosevelt's main lobby by taking the broad staircase to the left. On the rotunda to the right was a perfectly executed miniature stage setting of a famous Long Island estate with a Packard, of course, at the entrance. Gradually, by means of indirect lighting, day





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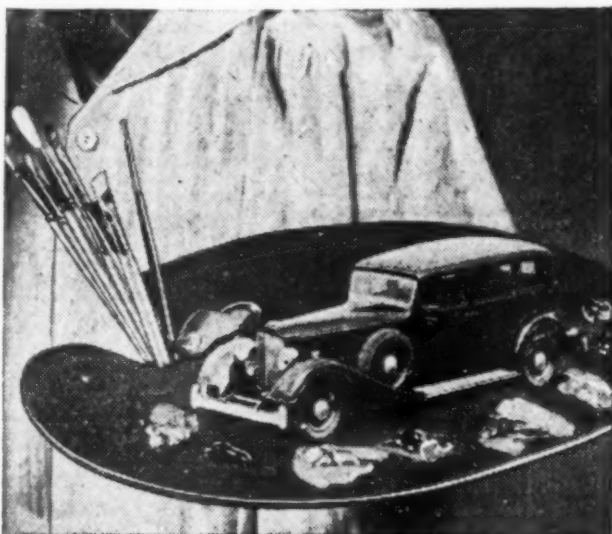
372 Bay Street Toronto 2, Canada

was slowly transformed into night and one could hear gay music coming from within the half-opened drawing room doors.

The visitor then moved on to a large artist's easel. Arrayed upon it was a group of ten paintings of Packards done in such delicate pastel shades as a study of the works of the great masters of a much earlier non-mechanical era indicate they might have chosen as their favorite. After careful examination I reached the conclusion that Rembrandt's taste and mine were identical on car finishes but my casual acquaintance at my left completely disagreed, which, after all, simply proved the individuality of color.

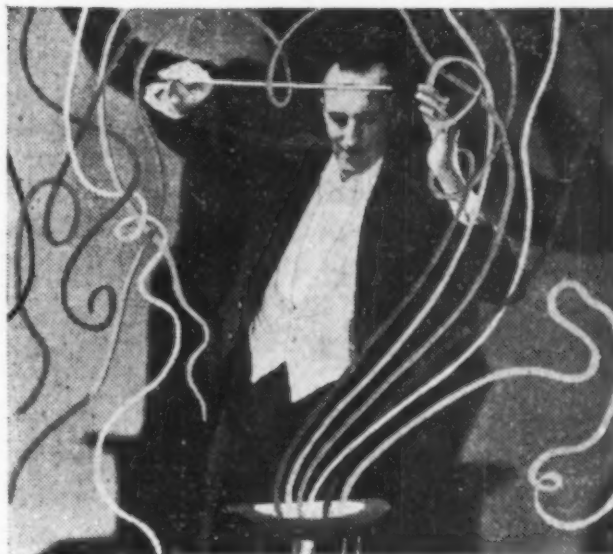
After a pause of several minutes to examine a number of cases containing unusually beautiful color specimens of coral, jewels, semi-precious stones, birds, insects and flowers, I entered into the main section of the exhibit. To the right were 33 miniature Packard doors each illustrating a step necessary to transform the car of raw materials into the polished beauty of the finished Packard. Each step was clearly labeled, and each door told its story in caption, picture and finish. "Packard literally hangs its finish on tiny little hooks that clasp and hug it tight" so the card of explanation read, and to prove its statement Packard had ready a perfect mechanical small-scale model of the blast cleaning machine used in the Packard factory, and a ready invitation to step up and clean-blast a sample piece of metal. And, just to make the proof still more positive, a handy microscope readily disclosed the innumerable hooks and claws. One learned that Packard specifications called for as many as eight successive coats of lacquer at a time between buffing and polishing steps in order to build up a smooth, satin, durable finish over the original rough metal surfaces. Each step was graphically illustrated with a large photograph inserted in the door window.

A step further down the Packard "Midway" brought me to



What color would you paint this car?

AT PACKARD'S marvelous Color and Fabric Salon in the Hendrik Hudson Room of the Hotel Roosevelt, you can have your favorite motor car color-scheme painted for you on a miniature car. Come and have it done. Learn how Packard makes use of the science of color in decorating its cars, in determining quality, and even in the selection of such materials as steel. See all the fascinating exhibits in this show—the greatest of its kind ever brought to New York. All this week. Admission free.



See the world's greatest color magician!

COME AND SEE the world's foremost color scientist present his awe-inspiring spectacle of Color in Nature. Watch him produce colors you never knew existed—and turn drab rocks into flaming jewels. See what an important part the science of color plays in the decoration of a Packard, in the determination of quality, in the selection even of such materials as steel. All this week at the Packard Color and Fabric Salon, Hendrik Hudson Room, Hotel Roosevelt. Admission free.

the story of lacquer. Here, graphically displayed, was the story of how lacquer is made—solvent, pigment, plasticizer. From the crowd gathered about it was easy to see that "Mr. and Mrs. New Yorker" were not only becoming color conscious but "Lacquer wise". On view were the 22 main pigments, the bases for 99 per cent. of all motor car-colors used today. Large palettes showed their blending and mixing to various tints and shades. Religiously following out instructions I jotted down the names of the suppliers—Rinshed-Mason, Ditzler Color, and Valentine and Co. Here too was the famous color analyzer, a small device by which Packard matched perfectly the delicate tint of the tiny slipper belonging to a distinguished maharane in far-off India. I took advantage of the attendant's most cordial invitation to peer through the color analyzer and to select a color choice for my next Packard!

To one side was arranged a group of charts or diagrams on which were accurately plotted the standard colors used by Packard. By means of these, fresh shipments of lacquer are constantly checked and the slightest variation detected.

Further along the story of fabric and color was being disclosed to an interested group. Next, a booth devoted entirely to the story of leather, next to that the innermost secrets of body-building. Gradually from booth to booth the visitors learned the story of color and its relationship in the construction and finish of a fine motor car.

Noting a particularly large gathering at one point I soon found that the cause for all the interest were two relatively simple devices for showing the vast difference in vision between "poor" safety-glass and the safety glass employed by Packard in all its cars. The "Electric Eye" showed graphically how freely light passes through high grade safety glass—and how it is partially stopped in its attempt to get through safety glass not

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made and inspected by latest methods. Awaiting my turn I tried the Distortion Device and saw how Packard's glass affords unobstructed vision. Finally the Radiometer tested the life of a piece of Packard glass showing how the plastic construction is so rugged that miles of travel does not distort it.

Suddenly arriving before what might be termed the "main tent" I found I was just in time for a lecture on color by one of America's foremost authorities. Eight times daily for the period of the week this lecture was given free, of course, to "Mr. and Mrs. New Yorker and guests" just to make them more color conscious.

After a very brief but satisfactory lecture on the principles underlying the science of light and its colorful component parts, the lecturer, with superb showmanship, directed ultra-violet rays upon various fluorescent minerals which glowed in gorgeous shades and hues. How could one describe them when proper descriptive adjectives have yet to be coined? One can say red, and unless our neighbor has proven (by means perhaps of the very simple device installed just in front of the lecture room) to be either totally or slightly color-blind, we can reasonably expect him to duplicate in his mind a representative shade of red. But what about hues not in this category?

Turning from ultra-violet light to the polariscope the lecturer proceeded to insert slides with infinitesimal amounts of such divergent products as sauerkraut juice, menthol, and other chemicals into the machine and to reflect a white light through the slides and then through prisms of Iceland Spar on the screen. But instead of just a bright, white light he, in turn, unfolded color harmonies defying the powers of description. By noting the color arrangements in nature, as represented, for example by the effects produced on the screen, so the lecturer informed the audience, we can safely use these as a guide to proper selection of colors and can feel certain that color harmony is present.

These instructive talks and sensational demonstrations gave the public a broader knowledge of the use of color in selecting clothes, furnishing and decorating the home, and last, but certainly not the least important, the selection of the motor car.

Genius Behind The Color Exhibit

This artistic representation of the applied art of color was the brain-child of an outstanding exponent of color. After quite a little manoeuvring I succeeded in cornering Herbert Thompson Strong in his New York studio. Though he was shortly due to leave for one of his scheduled talks on color at the Packard Color Salon, he was quite ready to discuss the subject of color and its part in the modern scheme of merchandising for the benefit of PLASTIC PRODUCTS' readers; but of his personal achievements I found it necessary to seek elsewhere.

Thirty years ago Mr. Strong designed the interior of the first closed Packard. As color consultant of the company he is constantly conferring with designers and engineers. Nor are his activities limited to serving Packard. From coast to coast he is known as an authority on color and the problems associated with its proper use.

Apologizing for the comparative barren state of his specimen cabinets, Mr. Strong remarked that in designing the "Realm of Color" for Packard he felt that it was most essential to prove that nature is the only satisfactory background for the study of color. So, despite the labor involved, he insisted that the exhibit should contain a large part of his specimens of nature's colors.

"My work as a designer of motor car interiors" Mr. Strong continued, "aroused my interest many years ago in collecting from the depths of the sea, from the highest mountain peaks, from the air, and from the dark, deep core of the earth, coral, minerals, jewels and semi-precious stones, birds and butterflies which I have used as motifs and as materials to study the way Nature adorns her creations. In no other way, by no other means, by no other short cut, can we reach complete color understanding and appreciation."

"Subconsciously", continued Mr. Strong, "the thousands who witnessed the display at the Hotel Roosevelt during the show began to feel the importance as well as the beauty of color. Once this state of mind is developed, it is less difficult to lead the audience to the conclusion that beauty attained by the proper use of color is essential to our modern mechanical devices and conveniences. This in a word is the thought that prompted Packard to such an ambitious display. To put it a little more baldly, prove first to your ultimate consumer the beauty and necessity of color, then show that your product has this beauty you prove so necessary, and the selling job is well on its way to a successful conclusion.

"Public interest in lacquer is widespread. Yet I doubt if but a very, very few know how it is made, what it consists of, why it is so different from paint. By showing at the color exhibit, through the use of the color analyzer, perfected by Bausch and Lomb, how each shade of color can be broken down and accurately charted, we demonstrated two things, first, that Packard can maintain an accurate check upon each and every shipment of lacquer so that shade variance is eliminated, and secondly, how it is possible to duplicate any particular shade a person's personal preference might dictate. By also showing practical scientific means of determining solvent balance, pigment transparency, pigment control, pigment fastness, pigment durability, purity of nitrocellulose, plastic balance, we were building up in the public's mind not only greater color consciousness, but greater respect for the scientific precision that it is possible to maintain in modern color technique."

"You noticed, did you not" queried Mr. Strong "that in my lecture, which one of my assistants gave several times a day at the Salon, great stress was placed on the study of color by means of scientific approach? By ultra-violet light, and polariscope and other scientific apparatus, I disclosed shades ordinarily beyond the physical possibility of the human eye. Many visitors who remained after each lecture, eager to ask further questions, indicate that color interests people more keenly than we suspect and, yet, generally speaking, few people really know anything about color values or their proper use."

For one thing, he pointed out, color-blindness is more prevalent than most people suspect. By means of a simple little device (eight colors fastened to a revolving disc) and by means of which thousands in attendance at the exhibit tested their eyes for color perception, Mr. Strong has found that while only four-tenths of one per cent. of women are color blind that four per cent. of men are. The percentage of people partially blind to certain colors is much greater.

Business Recovery and Color

One must seek far to find a more enthusiastic optimist over the future of color. Mr. Strong believes that those who are responsible for color, and in this lacquer producers play a most important part, are facing a golden opportunity. "Before the World War," continued Mr. Strong, now in a reminiscing mood, as we descended in the elevator, "I journeyed to England to purchase motor fabrics. At one of the oldest mills I was permitted to study swatch books hundreds of years old. In these I interpreted the history of England. Sombre blacks and dull grays silently told the story of great depressions. Flaming colorful hues bespoke of great days of prosperity. With recovery on the way we are on the verge of a great advance in the use of color." And he added after a moment's reflection, "I hope that it is properly done or the result will be tragic."

As he, with quick energetic steps hastened towards Columbus Circle, dodging by the fraction of an inch several cars milling around the Columbus Monument, I suddenly was thoroughly impressed with Mr. Strong's parting remark, "Over 80 per cent' of the sensations reaching the brain are or have to do with color." I jumped hastily to the curb, completely "sold" on color psychology.



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TURPENTINES—

Artificial, Synthetic, and Substituted Types Reviewed and Described by Ibert Mellan

GUM turpentine, gum spirits or spirits of turpentine, names given to natural turpentine, are the distilled and unchanged volatile oils obtained from oleoresins. Most of these natural turpentines find their sources from various species of the pine tree family. Chemically, their constituents are pinenes, limonene, dipentene, terpinenes, borneol, fenchyl alcohol, and traces of camphor. These chemical constituents vary in percentage with the source of the oleoresin. These natural turpentines have the common physical properties which vary only within reasonable limits. They are clear in appearance, colorless or nearly so, with a characteristic turpentine odor, specific gravity 0.875-0.862 at 15.5° C., refractive index 1.478-1.465 at 20° C., initial boiling point 160° C.-150° C., and 90 per cent. should distill below 170° C.

Even more varied, both in sources and in uses than the natural turpentines, are the artificial or synthetic and substituted substances. While these three types differ chemically, all have one important characteristic, namely, that of a common solvent power.

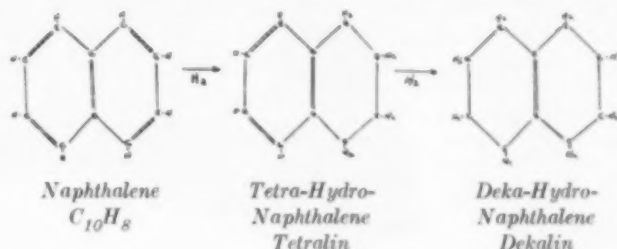
Unlike the substituted turpentines, the artificial or synthetic types have chemical properties somewhat similar to the natural products. Both the artificial and natural turpentines contain chemicals belonging to the terpene group. On the other hand, the substitute materials are entirely different chemically from both the natural and the synthetic. These substitutes are made from petroleum oils and contain their lighter fractions. Any substance used in place of the natural turpentine whether it is artificial, synthetic or a substitute should have the following physical properties:

1. Colorless and lustreless or nearly so.
2. Solvent and thinning powers for varnish and paint equal turpentine.
3. Odorless or an odor that is not disagreeable.
4. Evaporation uniform and not too rapid. It must not begin to distill over 120° C. and the upper limit should not be over 180° C.
5. Evaporation residue not over 0.5 per cent.
6. Flash point, 30° C. or above.
7. Specific gravity, 0.775 at 15.5° C.
8. Neutral in chemical reaction.
9. Clear and free of suspended matter.

One general type of turpentine substitute is made by the hydrogenation of naphthalene, sold under such trade names as Tetralin and Dekalin. The former represents the partial hydrogenation and the latter the complete hydrogenation of naphthalene. These do not appear on the market as chemically pure products but contain lower or higher hydrogenated naphthalene. U. S. P. No. 1,483,739 claims the use of hydrogenated naphthalene with or without the addition of natural turpentine as a diluent in shoe polish.

The petroleum fraction boiling between 150° C. and 170° C. consisting chiefly of Nonanes and Decanes is being sold as a turpentine substitute. Other mineral spirits of this same type are

made by the special oxidation or distillation of petroleum, gas and tar oils. Some of the other products in this group of substitutes are benzine, benzene and its homologs, solvent naphtha, heavy benzol, and white spirits. British Patent 6643 (1913)



speaks of a turpentine substitute obtained by the oxidation of petroleum oil with picric acid. The resulting product is then subjected to distillation at a temperature between 200°-250° C. Another process (Brit. P. 273,832 (1926) treats olefinic material with ozone or ozonized air at about 35° C. below the boiling point of the material. The substance obtained is suitable as a turpentine or linseed oil substitute to be used in paint.

Below is a list of the various key patents on turpentine substitutes made from a petroleum base.

French P. 354,425 60 parts of petroleum oil and 40 parts terebinthine are mixed and rectified over lime.

U. S. P. 1,543,570 Refined petroleum is treated with calcium carbide and an alkali. Pine oil is added to the finished product. Brit. P. 126,089 (1918) 100 parts of petroleum, 3 parts of soda, and 300 parts of water are distilled at 95°-110° C.

U. S. P. 1,572,902 An acidulated mixture of resin and naphtha is distilled.

Brit. P. 1927 (1911) A petroleum distillate.

French P. 661,183 (1928) Benzine and sulfur chloride are mixed and agitated. Calcium chloride or an alkali or alkaline earth hypochloride may be added at the same time.

Dan. P. 2219 (1917) Petroleum is distilled with a suitable alkali or an alkaline salt. This method serves to separate out the heavy oils.

Chemical Abstracts, 1927, page 1,346. Distillation of light oils from Russian petroleum.

Other products resembling turpentine which find their way into commercial channels are vegetable compounds similar to the terpenes. They are made by the oxidation, dehydration or special distillation of pine oil, rosin oil, pine needle oil, or other members of the terpene group of chemicals. Some are known as "wood turpentine," "sulfite turpentine," "Turpentine," "Terpentix," "Pinex terpeninol," "Teropine," and "Sangojol." "Recovered turpentine" and "regenerated turpentine" are names applied to mixtures of terpenes, often having a peculiar camphor-like odor. These are used as synthetic turpentine and are obtained as by-product in the manufacture of bornyl chloride and artificial camphor. Superturpentine is a spirit of turpentine rectified

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below 160°C. This eliminates all constituents other than pinene. "Sangojol," sometimes known as crude Borneo naphtha is a Borneo petroleum distillate containing cyclic hydrocarbons.

Following are some of the basic patents on synthetic turpentine made from terpene chemicals indicating the character and sources of these materials:

- U. S. P. 1,572,766 Gum of pine, Canada balsam or Peruvian balsam is mixed with 1-5% H_3PO_4 and distilled at 310°C.
- Brit. P. 27,024 (1908) Pine oil, resin oil or resin spirit containing 1 per cent. acetic acid are steam distilled.
- French P. 394,467 (1908) Pine oil containing one per cent. acetic acid or resin acid is heated under five atmospheres of pressure in the presence of moist ozone. Then 65 per cent. of slake lime is added and the mixture distilled.
- U. S. P. 1,463,122 Pine oil is fractionally distilled between the temperatures 225°C. and 350°C. In the process of distillation the vapors are subjected to the action of a catalyst such as cuprous chloride, cupric chloride, aluminum chloride, hydrochloric acid, or other metal chloride.
- U. S. P. 1,772,895 Pine oil is subjected to distillation in the presence of a contact catalyst (Fuller's earth) at a temperature of about 225°C. Instead of argillaceous earth such as Fuller's earth, silicious earths, such as kieselguhr may be used. Activated carbon may be used.
- Farben Ztg. 17,1069-7 Mixing colophony, light rosin oil, and a small amount of essential oils.
- French P. 400,180 (1908) Rosin oil is heated at 400°C. for 5 minutes in the presence of an alkali, then distilled with 0.5 per cent. lye.
- U. S. P. 1,691,066 A mixture of pine oil and a halogen is subjected to slow steam distillation. The halogen may be iodine, chlorine, or bromine. In addition to a turpentine substitute there is also formed borneol. The substitute has a specific gravity of 0.85 to 0.86, refractive 1.475-1.477 at 20°C., initial boiling point 170°C., and 75 per cent. will distill below 185°C.
- Another substitute is made by distilling colophony at 270°C. in a vacuum.
- U. S. P. 1,593,030 1,000 gallons of pine oil, and 50 lbs. each of phosphoric acid (85 per cent.) and sulfuric acid (66°Be) are mixed and heated to 120°C. for two hours. Often this reaction water is drawn off from the bottom of the container. The acid in contact with pine oil is neutralized with soda ash. The altered pine oil is then fractionally distilled. In place of the above acids other dehydrating materials may be used such as zinc chloride, iron chloride, aluminum chloride. The physical properties of the resulting turpentine are as follows: specific gravity 0.8620-0.8640 at 15.5°C., refractive index 1.4668-1.4673 at 20.0°C., initial boiling point 150°C-154°C., 90 per cent. will distill below 170°C., polymerization residue 2-3 per cent., flash-point 34-35°C., and water-white in color.
- German P. 3420 100 pounds of colophony, 20 pounds of soda and 50 of water are boiled together, and then mixed with 250 pounds of water and 24 pounds of ammonia. The resulting product is a substitute for turpentine or linseed oil.

Plastic Patents

Cellulose

Tracing sheet of cellulose hydrate with finely divided filler. No. 1,934,824. Schwalbe, Fuchs and Schenko, Wiesbaden, to duPont Cellophane Co., N. Y.

Continuous process for pulping fibrous materials. No. 1,928,802. C. E. Braun and A. H. Lundberg, Vancouver, to Chemipulp Process, Watertown, N. Y.

Method of preparing hardened film blanks for imbibition printing. No. 1,939,738. Bertha S. Tuttle, Boston, to Technicolor, Inc., N. Y.

Production of acetic acid and glucose by fermentation of cellulosic material. No. 1,939,736. P. A. Tetrault to The Wisconsin Alumni Research Foundation, Madison, Wis.

Cooking with sulfurous acid salt for cellulose digestion process. No. 1,940,136. G. Haglund, to Patentaktiebolaget G. R., Stockholm.

Fabric base with double films of cellulose nitrate and acetate. No. 1,940,212. G. C. Given, H. W. Letts and N. W. Thomson Parlin, N. J. to duPont Co., Wilmington.

Cellulose ester-sulfno-nitro-cellulose acetate. No. 1,940,218. Herbert Kranich, West Hempstead, N. Y.

Seamless articles from Celluloid, by recessing and softening. No. 1,940,223. L. J. Most, Kearny, N. J.

Phytosterol and fatty acids and resin acids from soap or resin from sulfate method of cellulose production. No. 1,940,372. H. Sandquist and T. O. H. Lindstrom, Kosta, Sweden.

Soluble cellulose esters of lauric, higher fatty, acids. No. 1,940,589. M. Hagedorn and G. Hingst, to I. G. F., Frankfurt, Germany.

Alkoxyalkacyl esters of cellulose. No. 1,940,709. H. Dreyfus, London.

Mixed alkacyl-alkoxyalkacyl esters of cellulose. No. 1,940,710. H. Dreyfus, London.

Reduction of solution viscosity of cellulose fiber. No. 1,941,154. G. A. Richter, to Brown Company, Berlin, N. H.

Plastic composition from cellulose acetate and chlorinated diphenyl. No. 1,941,262. R. A. Jenkins, to Swann Research, Inc., Alabama.

Three patents for compositions, ether derivatives of cellulose carbohydrates. Nos. 1,941,276-7-8. Arlie W. Schorger, to C. F. Burgess Labs., Inc., Madison, Wisc.

Vegetable condensation products from reactions of pectous residues with an aldehyde. No. 1,941,349. A. Hawerlander, to Estate A. D. Stewart, St. Joseph, Mo.

Treatment of vegetable fiber to recover fibrous and non-fibrous constituents. No. 1,941,350. A. Hawerlander, to Estate A. D. Stewart, St. Joseph, Mo.

Resins made from reacting pectose, an aldehyde and a ketone in presence of an alkali. No. 1,941,351. A. Hawerlander to Estate A. D. Stewart, St. Joseph, Mo.

Condensation product from pectous residues, acetone and formaldehyde in alkaline agent. No. 1,941,352. A. Hawerlander, to Estate A. D. Stewart, St. Joseph, Mo.

Tin salt solution method of metallizing highly polished surface Celluloid. No. 1,931,438. Karl Kiefer, Dresden, Ger.

Coatings

Cellulose nitrate coating composition using pearl essence and salt of half ester from dicarboxylic acid from the phthalic acid group. No. 1,939,676. G. R. Ensminger, to duPont & Co., Wilmington.

Washable, oil and grease resistant, artificial leather. Fabric base and backing and 2 cellulose nitrate coats. No. 1,940,462. E. H. Nollay & D. A. Rankin, Newburgh, N. Y., to duPont & Co., Wilmington.

Drier coating composition for use with oil-resin materials—metallic drier and phenolic inhibitor of crystallization. No. 1,940,613. C. A. Thomas, to Dayton Synthetic Chemicals, Inc., Dayton, O.

Coating composition, flaked pigment, drier, and solution of oil-modified polyhydric alcohol-polybasic resin. No. 1,941,398. J. W. Iliff & Paul Robinson, to duPont Co., Wilmington.

Machinery

Method and apparatus for cutting laminated materials, across the laminations. No. 1,938,394. H. Lyon, to G. O. Jenkins Co., Mass.

Method and apparatus for making cored articles of plastic materials. No. 1,939,894. J. O. Goodwin, to B. F. Goodrich Co., Akron, O.



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Plastics and Coating News

"Packaging Clinic" Plans Completed—Premium Exposition Dates Fixed—National Alliance Moves Exhibit To Rockefeller Center—Paint Recovery Board Meets In Chicago—Du Pont Viscoloid Suit Winner—Molded Insulation Group Meets—Revised Fabricators' Code Submitted.

"The Package's Part in Successful Promotion" will be the keynote of the clinics and conferences to be held in conjunction with the Fourth Packaging, Packing and Shipping Exposition at the Astor, March 12 to 16 inclusive, according to Irwin D. Wolf, secretary, Kaufmann Department Stores, Inc., and vice-president of American Management Association, under the auspices of which the exposition and conferences are being held. Conferences will be held all day Monday, March 12, and the mornings of the 13, 14, 15, and 16 will be devoted to conferences and clinics.

NRA and Packaging Problems

Part of the opening day's program will be devoted to the packaging problems which have arisen as a result of the National Recovery Act. Pros and cons of pending legislation affecting various aspects of packaging, packing and shipping will be discussed by packaging experts and administrators of NRA from Washington.

Jury of award who will judge entries for this year's Wolf trophy will examine competing packages Monday, March 12. Announcement of winners will be made at a luncheon at the Astor Tuesday, March 13, under the auspices of the American Management Association. During the luncheon the Wolf award will be presented to the manufacturer of the winning package, and certificates will be presented to winners of the other 11 classes competing for the grand prize.

"Clinic" Plans

Plans are being made for a pre-study of the packages to be examined at the clinics, by packaging experts who will make the analysis, according to Mr. Wolf. This examination of each package before it is actually submitted to the clinic is designed to prevent snap judgments and purely destructive criticisms by the critics. Packages which will be examined this year will be those which it has been determined to discard, some of which will be re-designed. Thus criticisms and suggestions of experts reviewing the package will not be post mortems of packages

already on the market, but will be pointers as to how the owner of each package can most effectively redesign it.

Premium Exposition

Premium Buyers' Exposition—Fourth National Premium Exposition and Convention is scheduled for May 7 to 11, inclusive, at the Palmer House, Chicago. This annual gathering brings the premium user, premium manufacturer and premium distributor together with a minimum amount of expense. With the premium code situation clarified so there is no restriction on the lawful practice of business promotion through the use of premiums, indications point to a larger use of premiums this year than ever before and already new activity is manifesting itself in the premium field. To the plastics industry the wider use of premiums offers many possibilities for increasing business. Space is now open for reservation and details are available from A. B. Coffman, exposition manager, 35 E. Wacker Drive, Chicago.

Newark, N. J., Shows Plastics

As a new chapter in its series of industrial exhibits, Newark Museum (Newark,

N. J.) has in preparation an exhibit for the layman which will be known as "Chemistry Changes Our World: An Exhibit of the New Discoveries for Industry and the Home." This is in furtherance of the Museum's policy of presenting exhibits related to the industries of its community, but because of the scope and timeliness of the Chemistry Exhibit, it is expected to attract national interest.

Already more than 100 national firms have accepted invitation to cooperate in the exhibit, which will open about the middle of March. Among the 1st to offer cooperation were E. I. Du Pont, Celanese, Bakelite, Beetleware, E. R. Squibb and Sons, Celluloid, Westinghouse Electric, Public Service Electric and Gas, Texas Gulf Sulphur, and others. Among Those who have offered to act in an advisory capacity to the exhibit, are Dr. E. C. Worden of the Worden Laboratories, Professor William T. Read of Rutgers, Dr. John H. Schmidt, Chairman of the North Jersey Section of the American Chemical Society, and Donald Deskey, decorator, of New York City.

Alliance Exhibit Plans

First comprehensive industrial design exposition ever held in the U. S. will open on April 1 and will run for a month at Rockefeller Center, under the auspices of the National Alliance of Art and Industry, which was founded with the assistance of Mr. John D. Rockefeller, Jr., and the Carnegie Corporation and carried on with the cooperation of American industry and outstanding American designers. Exposition will include every

November Paint, Varnish and Lacquer Sales

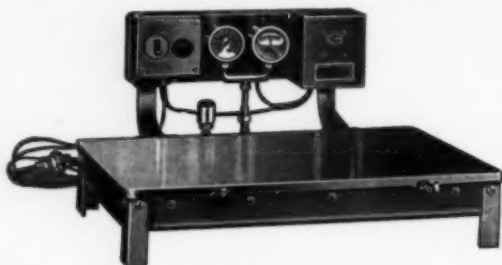
Sales of paint, varnish and lacquer products in November totaled \$16,234,234 in value, according to monthly report of U. S. Bureau of Census from data supplied by 586 establishments. This compared with \$18,944,106 in preceding month and \$12,494,818 in November, 1932. January-November sales in '33 were \$206,604,923, and sales for the corresponding period of '32 were \$193,838,795.

1933	Total sales reported by 586 establishments	Classified sales reported by 344 establishments				Unclassified sales reported by 242 establishments
		Total	Industrial sales	Trade sales of paint, varnish and lacquer	and varnish	
Jan.....	\$11,275,396	\$3,529,886	\$2,386,947	\$1,142,939	\$4,168,260	\$3,577,250
Feb.....	11,665,734	3,423,033	2,445,378	977,655	4,771,706	3,470,995
March....	13,578,668	3,391,947	2,484,550	907,397	5,788,213	4,398,408
April.....	19,043,787	4,677,309	3,143,803	1,533,506	8,582,411	5,784,067
May.....	26,241,044	5,991,938	4,298,455	1,693,483	11,788,573	8,460,533
June.....	27,813,233	6,827,509	4,832,551	1,994,958	12,443,998	8,541,726
July.....	22,090,187	6,406,184	4,493,516	1,912,668	8,627,400	7,066,603
August....	20,620,811	6,323,475	4,754,701	1,568,774	7,840,359	6,456,977
Sept.....	19,097,803	5,544,686	3,975,917	1,568,769	7,462,113	6,091,004
Oct.....	18,944,106	4,949,755	3,721,420	1,228,335	7,376,012	6,618,339
1932—Jan.....	15,894,506					
Feb.....	16,270,822					
March....	19,089,005					
April.....	22,612,193					
May.....	24,981,441					
June.....	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July.....	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
Aug.....	16,032,441	3,851,028	3,067,096	793,932	6,918,659	5,262,754
Sept.....	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
Oct.....	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
Nov.....	12,492,818	3,599,319	2,639,362	959,957	5,196,766	3,696,733
Dec.....	9,484,520	3,222,770	2,186,706	1,036,064	3,506,715	2,755,035
Totals	\$203,323,315					
1931—Totals..	\$78,442,170					

Comparable data not available

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type of industrial design, from a cigarette lighter to a three-car streamline electric train.

This exposition marks an important phase in the nation's recovery program,—the relationship of art to industry—and will cover the whole field of industrial products, designed to meet the requirements of American taste. According to its sponsors, wide experience has proved that good design insures early consumer acceptance and sustained sales over greatly lengthened periods.

Any article in which design is an element, and which is intended for mechanical duplication, already produced or in the process of production, is eligible. All entries will be passed upon by an official jury before being admitted to the show, in order to insure that this show will be truly representative of the best industrial art that America has produced to date.

The purpose of the exposition is three-fold: To create in commerce and industry the realization of the importance of design; to demonstrate that good design and sales value are complementary in our civilization; to emphasize visually that there is a definite trend toward a national style. Plastic industry will be well represented by a number of newly created objects of special interest.

Among the leading American designers cooperating are Walter Teague, Eugene Schoen, Norman Bel-Geddes, Donald Deskey, Gilbert Rohde, Henry Dreyfus, Russel Wright, George Sakier, Lurelle Guild, Egmont Arens, Lucien Bernhard.

Exhibit of "Man-Made Materials"

A dramatic and timely exhibition of "Fashions and Interior Decorations Developed in Man-Made Materials" is being planned by The Fashion Group, a non-commercial club of American women engaged in fashion work in this country and abroad. The exhibition will open to the public on March 15 in the Fashion Group's exhibit room in the RCA building, N. Y. City. It will close April 14.

America's outstanding makers of man-made textiles and molded materials will participate. Both industries will be represented in both fashion and interior decoration divisions of the exhibition. Fabrics shown will include, of course, mixtures of various textiles currently distinguished in the mode.

Plastic producers will appear in furniture, decorative accessories, such as cigarette boxes and cases, cocktail shakers and desk sets; in bars, lamps and lighting fixtures, toilet articles, clocks, barometers, vases, mirror frames, and other decorative equipment for the entire modern house, including drawing rooms and bath rooms, bedrooms and kitchens.

Miss Marion C. Taylor, merchandise editor of *Vogue*, is chairman of the Fashion Group Committee in charge of this exhibition. Members of the com-

COMING EVENTS

American Management Association, 4th Annual Packaging Exposition, Hotel Astor, N. Y. City, March 13-17.

Fashion Group, "Fashions and Interior Decorations Developed in Man-Made Materials, 30 Rockefeller Plaza, Rockefeller Center, March 15-April 14.

A. C. S. 87th Meeting, St. Petersburg, Fla., Hotel Vinoy Park, week of March 25.

Industrial Arts Exposition, National Alliance of Art & Industry, 30 Rockefeller Plaza, Rockefeller Center, April 1-30.

Fourth Annual National Premium Exposition and Convention, Palmer House, Chicago, May 7-11. A. B. Coffman, Exp. Mgr., 35 East Wacker Drive, Chicago.

mittee are: Mrs. Margaret Dargan, of R. H. Macy's; Miss Emma Lou Fetta, chairman of the Press Committee of The Fashion Group; Miss Kathleen Howard, of Paramount Pictures, president of the Fashion Group; Miss Aimee Larkin, of *Collier's Weekly*; Miss Eleanor LeMaire, interior architect; Mrs. Mary Brooks Picken, merchandise consultant, 1st vice-president and president pro tem of the Group; Mrs. June Rhodes, director of the Velvet Group; Mrs. Alice Sharkey, director of the forth-coming exhibition, and Miss Dorothy Shaver, vice-president of Lord and Taylor.

Members of The Fashion Group's Advisory Council include: Mrs. Edna Woolman Chase, Miss Grace Cornell, Miss Marjorie Howard, Miss Mary Lewis, Mrs. Ogden Reid, Mrs. Franklin D. Roosevelt, Miss Shaver and Miss Taylor.

In referring to the purposes of the Man-Made Materials' Exhibit, Miss Taylor and Mrs. Sharkey explained that "as a non-commercial organization, Fashion Group feels it can call unbiased attention to the tremendous industrial achievements in the fields to be represented; pointing out dramatically the enriching value of these achievements to contemporary living."

Coatings

Paint Industry Recovery Board met in Chicago on Jan. 5 and listened to words of congratulation from NRA Major Charles R. Baxter, administration member of the Paint Recovery Board, on the way the industry had drawn up and was also administering its code.

An executive committee was elected to act for the Board in matters where it is not feasible or expedient to bring the entire group together.

New committee is composed of H. A. Melum, Benjamin Moore, Chicago; J. D. Patton, Pittsburgh Plate Glass, Milwaukee; E. S. Phillips, Devos & Raynolds, N. Y. City; Wm. Richter, DuPont,

Wilmington; F. L. Sulzberger, Enterprise Paint, Chicago; E. T. Trigg; J. V. Reardon, The Reardon Co., St. Louis; Rudolph Neuberger, Zapon Co., Stamford, Conn.; and A. E. Horn of A. C. Horn Co., Long Island City.

E. S. Philips was elected chairman of the executive committee and Frank L. Sulzberger vice-chairman. President Trigg read a report on the association's activities since the Chicago convention, and several reports were read and accepted. Resignation of Thomas J. McFadden as general manager of the association was accepted with regret. George B. Heckel, well-known figure in the paint and varnish industry for years, was elected secretary-emeritus of the association in appreciation of his untiring efforts in the past.

Williams, NRA, Resigns

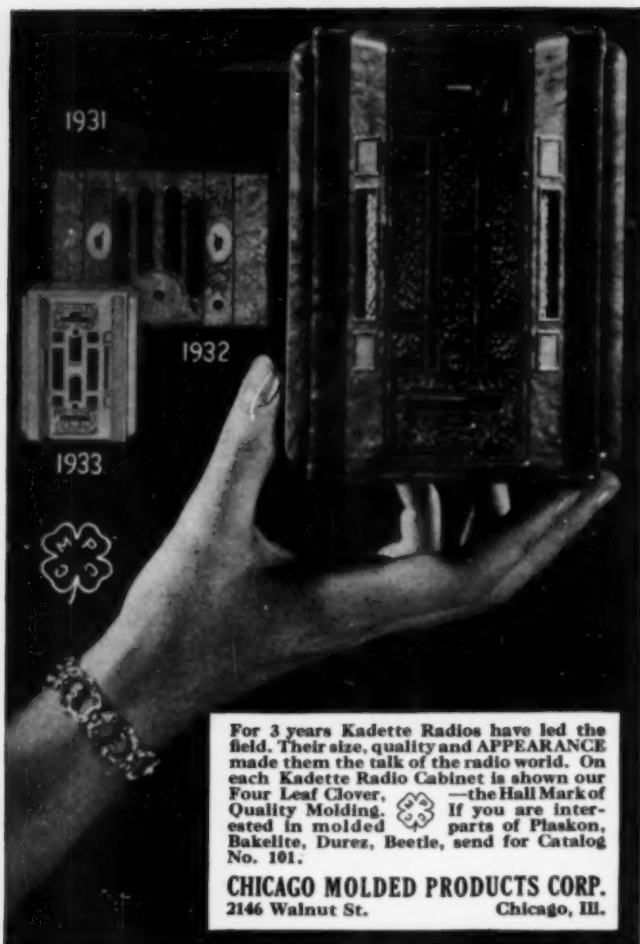
General Williams, who in the past 5 months has become well known to the chemical, paint, varnish and lacquer, fertilizer, and other industries allied to the chemical, in his capacity as NRA division administrator, has been forced to yield his position temporarily due to illness in his family. His successor, at least temporarily, is Major George L. Berry, Pressman, Tenn. Major Berry is president of the International Pressman's and Assistant's Union. He joined NRA early in its period of formation as a member of the labor advisory board. He was later appointed to the National Labor Board. It is expected that in his new position he will relinquish his labor board posts.

Said NRA head, General Johnson, commenting upon Major Berry's appointment: "He has the confidence of both industry and labor. In the whole course of this administration I have known nobody who more fully understood or who was more devoted to the President's program. We cannot here appoint crusaders for any particular point of view but, after consultation with leaders of every faction, I have been advised that Major Berry's appointment will be welcomed by all groups."

Du Pont Viscoloid Suit Winner

DuPont Viscoloid has been victorious in its suit charging that certain plastic material, imported by the New York Merchandise Co. from Japan, infringed the Higgins patents which DuPont owns. Judge F. J. Coleman in the U. S. District Court for the Southern District of N. Y. signed a decree, Jan. 2, holding the patents to be valid and to have been infringed and enjoining the N. Y. company from further infringement.

Action in this matter was begun by DuPont Viscoloid in July, '33, charge being that the company's patents, U. S. 1,607,624 and 1,606,030, covering "mother-of-pearl" plastic material containing fish-scale essence, were being in-



1931

1932

1933

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fringed in the importation of Japanese goods by the New York Merchandise Co. Case was tried Dec. 27 to 29, and the court found patent No. 1,606,030 good and valid as to claims 17 to 27, inclusive, and patent No. 1,607,624 good and valid in all claims, and that the patents had been infringed as charged.

No accounting for judgment was ordered, the defendant agreeing not to import any more of the material and to re-export infringing articles in transit from Japan.

Chicago Furniture Style Show

Attendance at the Chicago Furniture Style Show, held at the American Furniture Mart, indicates a bright outlook for the coatings industry. Total attendance of 3,142 during the 1st 6 days of the exposition exceeded the entire registration of some of the winter shows held during the worst of the depression. Largest increase came from buyers from the middle-west states. Total attendance figures were not given out as the show ended Jan. 13, but were estimated at close to 5,000. Exhibits also indicated strong possibility in further expansion in the use of colors in furniture.

Elton Succeeds McFadden

National Paint, Varnish and Lacquer Association has named Reuel W. Elton secretary. Mr. Elton is no stranger to the paint field. He was secretary of the American Paint and Varnish Manufacturers' Association, and at the same time assistant general manager of the N. P. O. & V. A. These 2 associations were amalgamated at the last paint convention into the single national organization now functioning. Mr. Elton resigned from the paint associations in '32 to become associated with the Better Business Bureau of Pittsburgh. He is well-known in veterans' circles, having served in executive capacities in several organizations, he was a captain in France, and is a chevalier of the French Legion of Honor. For a number of years he served in the organization division of the Pittsburgh Chamber of Commerce.

Glidden Acquires Patents

Glidden has reduced number of directors to 9. President Joyce reports total sales for past 2 months of the fiscal year 37% ahead of the corresponding period 12 months ago. "Glidden has recently secured some valuable patents in its chemical and pigment divisions in connection with new and unusual pigments that promise additional profits," he stated. "Important announcements will be made shortly."

He reported also arrangements with Extractochemie A. G., Zurich, for rights on patented processes and equipment for vegetable oil production and refinement,

promising better products and economies. Control of Nelio-Resin, Jacksonville, (with new plant for producing nelio-resin from crude gum) has been acquired. Glidden is considering reopening several mining properties.

Glidden is being sued by the government for collection of \$2,197,329 allegedly due on industrial alcohol allegedly diverted for beverage purposes. Suit is the 2nd of its kind, another having been started against United States Industrial Alcohol Co. for \$8,000,000.

Suit of the government against Glidden is absurd, Adrian D. Joyce, president of the Glidden Co., stated in an interview.

"It is well known," Mr. Joyce said, "that we have long sold lacquer and lacquer thinner to users and to other manufacturers. Several years ago we sold some thinner to a N. Y. manufacturer who was found later to be diverting it into bootlegging channels. With our aid the government traced the alcohol, and when we were named in a suit on advice of counsel we pleaded nolo contendere, paying a \$10,000 fine rather than enter into long and expensive litigation. It is this case which has been brought up again. We sold only a few hundred thousand dollars worth of thinner altogether."

A. S. T. M. Projects

Committee D-9 on Electrical Insulating Materials, has a number of research and standardization projects under way, some of which are briefly mentioned here. One of the studies is a joint one with Committee D-1 on Preservative Coatings for Structural Materials involving methods of testing shellac and artificial resins. Objective is preparation of test methods which will be useful in connection with electrical uses of these materials. Available methods of test are to be studied and their suitability determined and new methods will be prepared. Current efforts are being directed to flow characteristics and polymerization time.

Coatings Standards

"A. S. T. M. Standards on Preservative Coatings for Structural Materials" contains all of the 92 standard and tentative specifications, methods of test and definitions, issued by American Society for Testing Materials, covering pigments, oils and thinners, varnish and varnish materials, lacquer and lacquer materials and miscellaneous related subjects. It is the 1st time this material has been compiled in a single publication.

Book includes a number of tentative specifications which were approved last year (1933) and also gives in their latest form the 16 standards which were adopted during 1933. All of the revisions of standards which had been tentative and were adopted as standard last year are included.

New tentative specifications cover the following materials: spirits of turpentine; shellac—and centrifuged shellac—varnish; tricresyl phosphate; industrial benzene; industrial toluene; solvent naphtha; and test methods for soluble nitrocellulose base solutions.

Materials covered by standards adopted in 1933 include the following: raw tung oil; boiled linseed oil; dry bleached, and orange, shellac; soluble nitrocellulose; ethyl acetate; normal butyl acetate; butanol; amyl acetate; amyl alcohol; butyl propionate; ethyl lactate; and acetone. Also methods of sampling and testing shellac and lacquer solvents and diluents.

The 7 standard methods of testing in which revisions, previously published as tentative, were adopted as standard include 6 methods of routine analysis, covering dry red lead, yellow, orange, red and brown pigments containing iron and manganese, titanium pigments, dry cuprous oxide, dry mercuric oxide and white pigments. Test methods for hygroscopic moisture in pigments and methods of sampling and testing turpentine are also included.

In addition to materials listed above many others are covered by standard and tentative specifications and test methods, including a number of pigments, oils and thinners, varnish and varnish materials.

Copies of this publication, aggregating 350 pages, in a heavy paper cover, can be obtained from A. S. T. M., 1315 Spruce st., Philadelphia, Pa., at \$1.25 per copy.

Committee "D-1's" Program

A. S. T. M. Committee D-1 on Preservative Coatings for Structural Materials has an active program under way. Specifications and methods of test are being written for all lacquer solvents in common use, that are not already covered by the A. S. T. M. Testing of lacquer resins has, in the past, given considerable trouble, and this standing committee is undertaking some cooperative work that will lead to the establishment of acceptable methods of test. Activities in the development of hardness and abrasion tests for lacquer films are being continued. Several groups have been formed to develop information with respect to testing of house paints, enamels, varnishes, lacquers, and the preparation of adequate specifications to cover panel tests on exterior exposure.

Work is under way on the present Tentative Specifications for Petroleum Spirits (Mineral Spirits) (D 235-26 T) with the view to restricting present distillation range requirements to a point that will prove commercially feasible.

Committee plans to develop a comprehensive definition for the term "solvency" to meet a need that has been quite generally expressed. Revisions are being considered in the Specifications for Raw Tung Oil (D 12-33) to provide in-

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creased stringency and in a number of the standard methods of analysis.

Tentative specifications are being developed to cover bituminous types of primers for underground pipe protection. Work is being continued on the development of methods for the apparent color of heavy base solutions, for the purpose of establishing suitable color standards.

Company News

Barrett Co., 40 Rector st., N. Y. City, has just issued a 32-page booklet describing in intimate detail paracourarone-indene resin and sold under the trademark of "Cumar."

American Cyanamid and subsidiary companies are moving to Rockefeller Center from 535 5 ave., N. Y. City. Plastic divisions are: Beetleware Corp.; Rezyl Corp.; and Synthetic Plastics Co.

Ault & Wiborg has taken over lacquer division of Van Schaack Brothers Chemical Works, Chicago, and will operate it as the Van Schaack division. Production will eventually be transferred to Cincinnati.

"The Moisture Permeability of Various Protective Coatings" is discussed in an 8-page pamphlet recently published by Hercules Powder. Booklet contains some of the conclusions on this subject reached by the company's experiment stations. Pamphlet has a full page graphic chart showing the rate of loss of water vapor through films of various protective coatings, as well as a number of comparative tables of research data. Copies are available by writing this magazine or Hercules Powder, Wilmington, Del.

Cellulose

A sub-committee of the Fabrics Research Committee, London, has recently recommended a standard method of conducting viscosity tests for cellulose solutions and of expressing the results obtained. A report on the system proposed has been published by H. M. Stationery Office. In reviewing the work so far done, report showed that there was no demand for a test of strict academic accuracy. In industry, the 1st use made of viscosity measurement was as a control of the cellulosic raw material for nitration in the explosives industry. In textile manufacture, significance of the test was found in its close relationship with the tensile strength of the solid fibre. In the pulp and paper industries, only the experimental stage of the use of the test had been reached, but interest was shown, as viscosity determinations afforded a convenient method of grading rags for strength.

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Safety Glass "News"

Engineers of the Union Pacific and the Burlington, both of which are building the newest type of high-speed trains capable of 110 miles per hour, have chosen Duplate safety glass for both trains.

Libbey-Owens-Ford Glass, Toledo, is expecting to benefit materially this year by the increased use of safety glass. This will be due to new laws becoming effective in several states requiring its use and the '34 specifications of additional cars calling for its use. A survey made by the company shows that 20% of the cars made in '33 used safety glass, while laws in several states will cause 35% of all cars to use it in '34 and 65% in '35.

Sylvania Introduces

Sylvania Industrial is now manufacturing at its Fredericksburg, Va., plant viscose caps and bands for all types of bottles, jars, etc. "Sylphseal" is the trade-mark.

Japanese pyroxylin production has doubled in the past few years, according to reports.

Molded

The Molded Insulation Group met Jan. 12 at NEMA headquarters in N. Y. City at the call of Chairman George K. Scribner. The Group voted approval of the selection of E. H. Ott, Westinghouse Electric, as supervisory agency for the construction material section. Secretary J. B. Neal then read a letter received from other group members of the Construction Materials Section calling attention to the desire on their part to engage a permanent secretary and inquiring if the molded insulation group cared to use part of his time and would share in the expense. After considerable discussion it was decided to take no action at this time. Copies of the Plastic Fabricators' Code were presented to the group for consideration, and it was finally decided that group action at this time was unnecessary.

Those attending included Prescott Huidekoper, American Insulator; A. S. Blackinton, Associated Attleboro Manufacturing; Douglas Woodruff, Auburn Button; George K. Scribner, Boonton Molding; Roy Cunningham, Bryant Electric; Thomas E. Giblin, General Electric; E. Steinberger, Insulation Manufacturing; H. H. Wanders, Northern Industrial Chemical; James B. Neal, Norton Laboratories; Harry M. Burt, Royal Molding; Frank A. Shaw, Shaw Insulator; E. A. Terkelsen, Terkelsen Machine, J. H. Parker, Union Insulating; C. B. Buckingham and J. R. Neill of Watertown Manufacturing; Robert C. Gilmore, Jr., PLASTIC PRODUCTS.

Plastic Products

Miners' hats made of synthetic resinous materials are meeting with good demand in England.

Fabricators' Code Submitted

Code of the plastics fabricators is moving closer to final NRA approval. Acceptances of the 2nd revised edition of the code, prepared after the public hearing in Washington, were received during the past month by the code committee, and as the month closed the revised code was submitted to Washington for final review.

Liquor Bottle Tops

According to *Modern Packaging*, screw-caps for liquor bottles are going to be 3 types, molded plastic, double shell metal, and single shell metal. And, they prophesy, molded caps will enjoy the greatest sales volume.

Novel Molded Base

Frederick Stearns & Co. has a new special combination group of shaving cream, talcum powder and face lotion held in a special molded base which is suitable later as an ash-tray. Made of Durez and molded by Norton Laboratories.

New Recruits To Molded Tops

Closure News for January (General Plastics) is authority for the statement that Dr. C. H. Berry Co., Chicago, is now using scarlet and black molded jars in 2 sizes and color combinations. Colt, Hartford, is the molder. Mentholatum and Ingram's have turned to molded caps (Durez). *Closure News* for January continues the series of thumbnail sketches of well-known designers—this month—Lucian Bernhard.

Important Litigation

Question of what constitutes a mixture prepared from phenol was decided adversely to importers on Jan. 2 by the United States Court of Custom and Patent Appeals.

Product, imported by Kuttroff, Pickhardt & Co., consisted of automobile body paint classed as primer surfacer, and consisted of 9% of synthetic resin mixed with pigments, talc, and plasticizers. Resin was made from cyclohexanone which was derived from cyclohexanol, which in turn was derived from phenol. Government claimed paint was dutiable under coal tar section of the tariff law, (paragraph 28). Importers claimed that the resin content was not prepared from phenol but was two chemical steps removed, each intermediate product being a distinct chemical.

Court noted that Congress used both the terms, "derived from phenol" and "prepared from phenol," in the same act,

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but concluded that no distinction had been intended; because when this language was originally written, after the close of the war, Congress apparently aimed to give protection to all coal tar products.

Judge Garrett dissented from majority decision asserting that the product is not a mixture but a compound; that it is not prepared from phenol but from a separate chemical; and that the court should not depart from the usual rules of construing a statute because of its idea of the general purpose of Congress.

Personal-Personnel

Stephen C. Babcock, synthetic and ester gum expert, recently made manager of sales on oil soluble resins for General Plastics, is now on a tour of the consuming trade in the middle west. Mr. Babcock enjoys a wide acquaintance in the varnish industry, where he has spent his entire business career.

M. H. Bigelow, Toledo Synthetic Products' research chemist, now stationed at Mellon, has joined the growing list of plastic industry workers in the ranks of the A. S. T. M.

George Switzer, N. Y. designer, announces appointment of Barry Stephens as his special representative to advertising agencies, and Charles Stephens, authority on retail market development, as representative to manufacturers on product design and merchandizing. The Stephens brothers are in the Chanin Bldg., N. Y. City.

From the Foreign Plastic News

British Cyanides' release of its fiscal report for year ending June 30 showing net of £12,724 as against £9,321 in the preceding 12 months, also discloses further details of the Pollopos deal. As part consideration for the purchase the company has transferred to Pollopos, Ltd., its interest in Synthetic Plastics (Cyanamid-Beetleware).

Reference is also made to new lacquer resin developed in the company's laboratories, and for which special equipment for manufacture is to be installed at Oldbury. All I. G. patents on lacquers and lacquer resins of the urea type have been acquired for England, and manufacture of Plastopol resins made by I. G. will be undertaken at Oldbury, together with that of any new lacquer resins of the urea type that may be discovered.

British Plastics Federation has been formed in Great Britain for the purpose of promoting co-operation between British manufacturers and others engaged in the plastics and allied fields. Secretary is E. Williams, 19 Ludgate Hill, London, E. C. 4.

George Dring, development manager of Bakelite, Ltd., England, discussed shortage of natural phenol in England

before Birmingham Section and Plastics Group of the Society of Chemical Industry recently and reported that it might yet be necessary to resort to synthetic production.

Blumauer Explosives Works (Austria) is erecting a plant for the manufacture of cellulose lacquer. This will be the 1st time that nitrocellulose has been made in Austria since the war.

Phenol synthetic resins are being produced in the Argentine by Pisetta Hermanos y Gojberg, Buenos Aires. Phenol and formaldehyde are imported. Phenol output of Cia Primitiva des Gas de Buenos Aires is used in animal remedies. State Petroleum is investigating formaldehyde production from petroleum.

In Washington

Services to coal tar products trades and consumers will be continued in '34 according to C. C. Concannon, chief, chemical division, Bureau of Foreign and Domestic Commerce. These services consist of a monthly statement of imports of dyes and other coal tar products into U. S. together with a weekly bulletin which gives news of the world affecting domestic chemical industry.

Import statement (No. 2865) details imports of dyes and other coal tar products giving quantity and invoice value, countries of origin, bonded warehouse stocks, and other information designed to enable manufacturers and others interested in the trade to gauge competition from foreign imports, plan purchases, and follow advances in foreign technical progress. The usefulness of this unique service has been demonstrated to the synthetic organic chemical industry as well as to consumer trades, such as those relating to textiles, paper, leather, plastics, rubber and the like as well as to manufacturers of medicinals and pharmaceuticals and industries using flavoring and perfume materials.

Washington has been chosen as the city for the fall convention of the National Paint, Varnish and Lacquer Association but no definite date has been set as yet.

Interesting Delivery Service

Pennsylvania has started a system-wide door to door collection and delivery service and other railroads are working out similar plans.

For distances up to 260 miles, this additional service will be performed without extra charge, except that a minimum rate of 35c is observed. On higher rated commodities this minimum is operative for only the very shortest distances—under 25 miles. On paints, varnishes and lacquers, this minimum prevails on shipments for distances up to 170 miles. Beyond 260 miles, there is a sliding scale of charges starting at 2c for pick-up or delivery or both, and reaching a maximum

of 6c for either pick-up or delivery and 12c for both pick-up and delivery.

Company Booklets

No. 23. Eagle-Picher Lead Co. Temple Bar Bldg., Cincinnati. December issue of this valuable paint organ features specially fine article on "Selecting Interior Color Schemes."

No. 24. E. I. du Pont de Nemours & Co., R. & H., Chemicals Dept., Wilmington. New quarterly price list should be in the hands of every user of chemicals.

No. 25. The Allen Manufacturing Co., Hartford, Conn. New booklet, prepared by a leading firm of engineers for the Allen Manufacturing Co., showing the holding power and proper sizes of hollow screws to use. It is reported that nothing has been published along similar lines in the past.

No. 26. Blackmer Rotary Pump Co., 1809 Century Ave., Grand Rapids, Mich. New 32-page booklet which describes in detail complete line of Blackmer pumps with capacities ranging from 5 to 500 gals. per minute. Specially well-illustrated.

No. 27. The Exact Weight Scale Co., Columbus, Ohio. A specially prepared prospectus for the chemical and allied industries describing the variety in Exact Weight Scales, with capacity ranges from 4-ozs to 500 lbs. Producers with weighing problems will find this booklet of special interest.

No. 28. General Electric Co., Schenectady, N. Y. "Spots of Heat" is a booklet cleverly made up in movie-strip showing how small heating problems in plants are successfully handled.

No. 29. The Harnischfeger Corp., 4400 W. National ave., Milwaukee, has a new bulletin on "Hoists" (RH-1) for every plant and purpose. This interesting publication treats upon the application of hoists to both general and specific problems. Profusely illustrated in color with photographs of installations and diagrams explaining simplified construction and operation, it covers the vital points in modern hoist design. Bulletin lists the ratings and operating ranges for type "R" hoists along with specifications and electrical accessories.

No. 30. Link-Belt Co., 519 N. Holmes ave., Indianapolis, Ind. New illustrated catalog on flexible shaft-couplings. Three different types are tabulated and priced, with special emphasis on type "RC" which employs Link-Belt Silver-link Roller Chain for flexibly connecting the 2 toothed coupling halves. Both revolving and stationary types of automatic-lubricating casings are included. Selection of the right coupling for the work is made easy by a series of conveniently arranged tables.

No. 31. Republic Flow Meters Co., 2240 Diversey Parkway, Chicago, has issued 3 new booklets: No. 800 describes Republic Multi-Point Draft and Pressure Indicator; Bulletin No. 900 describes Republic Remote Liquid Level and Pressure Recorders and Indicators; and a profusely illustrated 24-page booklet describing the new Republic Flow Meter "with cartridge sealed elements." Complete engineering data is given.

No. 32. The Sharples Specialty Co., 23rd and Westmorland ave., Philadelphia. A 4 page leaflet describes the new Sharples Laboratory Super Centrifuge, giving complete data and uses.

No. 33. New Jersey Zinc Co., 160 Front st., N. Y. City. Latest issue of *The New Jersey Zinc Alloy* Pdf admirably describes a number of new and unusual uses for zinc.

No. 34. Fisher Scientific Co., Pittsburgh. *The Laboratory*, latest issue, has more than the usual number of new equipment, new methods of value to the analyst and laboratory worker.

No. 35. Pittsburgh-Des Moines Steel Co., Neville Island, Pittsburgh. Technical Bulletin No. 3304 is an informative and useful report covering exhaustive and practical large scale tests of the durability of almost 200 kinds of paints and other coatings materials, offered for use on interiors of steel water tanks. A table is printed in which the paints and coatings used are given a per cent. rating: 1. in order of their durability and relative cost per gallon and per unit of coverage; 2. by name of product and producer.

No. 36. Dearborn Chemical Co., Straus Bldg., Chicago. A new booklet describing use of "No-Ox-Id (rust preventative) on metallic equipment for the prevention of corrosion.

No. 37. Quigley Co., 56 W. 45 st., N. Y. City. "Preventing Corrosion with A. A. A. Coatings is a worthwhile booklet for the plant manager harassed with surface problems from corrosive chemical fumes. Many colors are available for distinctive painting of various pipe lines.

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AVAILABLE—Salesman Plastic Experience—large following Jewelry, Dress, Millinery, Ornament Jobbers also chain stores—Desires connection with reliable firm—can design lines wanted. Reply to Box 623, Plastic Products.

WANTED—Research Chemist by large Bakelite molder. State experience and wages expected. Reply to Box 624, Plastic Products.

AVAILABLE—A chemical Engineer—age 29—with following experience: Asbestos Brake Linings—one year; Cold Molded Asbestos Insulating Materials, two years; Asbestos Paper and Asbestos Millboard, one year; is immediately available to anyone interested in his services. Address Plastic Products, Box 621.



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